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MODERN METALS

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Aluminum + Plastic + Good Design = SUCCESS in SIGNS (page 32)

NEXT MONTH: *Yates Committee's Hearings On Competition in Aluminum*

AJAX
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AJAX
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miss is as good as a thousand miles

the higher you aim
for new **productivity**
the more you need
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on quality

SCOVILL®

brass
copper
aluminum
MILL PRODUCTS

MADE IN USA

. . . and made better to bring out the ***BEST*** *in your products*

SCOVILL MANUFACTURING COMPANY
Mill Products Division, 99 Mill St., Waterbury 20, Conn., Phone Plaza 4-1171

6SC60

SCOVILL

gives you fault-free metals for **high speed** fabrication

Advanced mill processes — Scovill pioneered the CONTINUOUS CASTING of Brass alloys to bring fabricators of Brass Mill Products the new standard of metal soundness and uniformity made possible by this unique process. Other more recent new mill installations at Scovill include precision-controlled Aluminum rolling mills; the advanced Sendzimir Mill for extra-close-tolerance sheet and strip; the World's largest vertical tube extrusion press, with automatic induction billet-heating equipment, as well as one of the Industry's newest and largest specialized tube mills.

Advanced quality-control procedures — insure dependable UNIFORMITY in all Scovill Mill Products specifications . . . order to order and lot to lot. They promise more accurately dimensioned, finer quality mill products essential to efficient high speed fabrication. Quality-control is a full-time job at Scovill, and the results are evident to fabricators in their own higher production speeds, minimum tool and machine adjustments and superior quality of finished products.

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Make Scovill a part of your competitive team, let us contribute our wealth of experience and ultra-modern equipment to the success of your NEW products and production plans.

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Mill Products Division, 99 Mill Street, Waterbury 20, Conn. Phone PLaza 4-1171

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. . . and made better to bring out the ***BEST*** *in your products*

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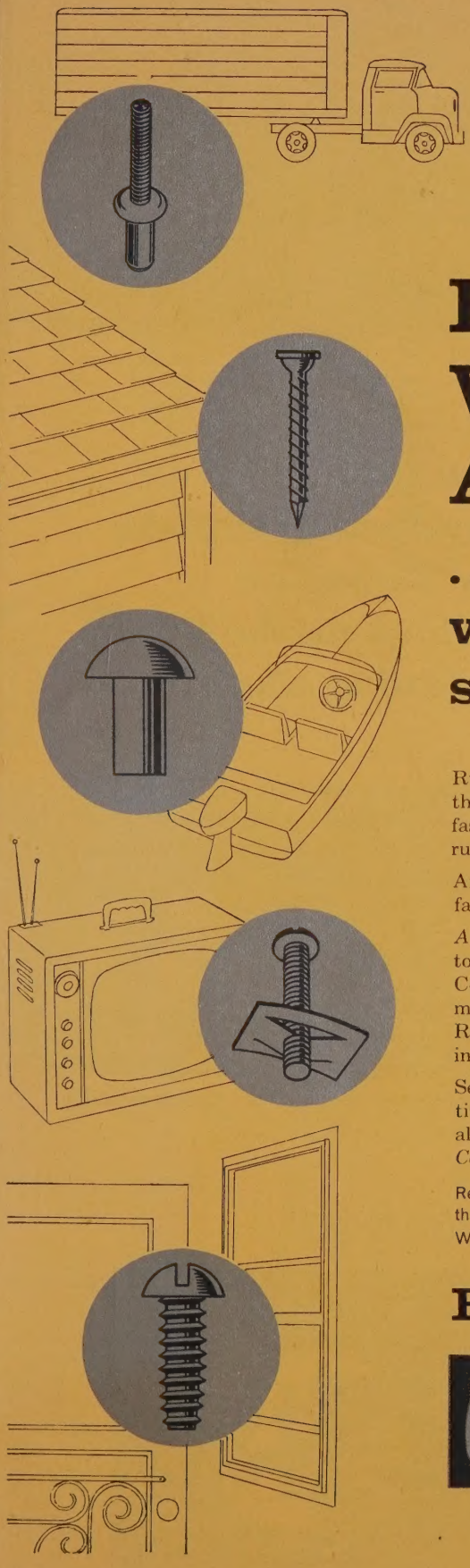
MILL PRODUCTS



FASTEN WITH ALUMINUM

...your product will look better longer, stay much stronger

Rusted fasteners—and the stains and weakened joints they cause—just can't happen if you specify *aluminum* fasteners. Aluminum provides protection against harmful rust; it resists corrosion; it will not weaken with age.

And, if your product requires maintenance, aluminum fasteners never bind because of rust!

Always fasten aluminum parts with aluminum fasteners to prevent deterioration possible with dissimilar metals. Consider aluminum components and fasteners for other materials—wood, plastic, textile and plaster products. Remember: even coated ferrous fasteners can be damaged in assembly and create corrosion problems at a later time!

See your fastener supplier or your Reynolds representative about the many ways products can be improved with aluminum fasteners. Or, write to the *Reynolds Metals Company, P.O. Box 2346-NL, Richmond 18, Virginia.*

Reynolds does not make aluminum fasteners, but does supply the finest quality aluminum to the fastener industry . . .
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REYNOLDS ALUMINUM

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"ADVENTURES IN PARADISE" "BOURBON STREET BEAT"
and "ALL STAR GOLF"—ABC-TV

aluminum fastening

RIVETING ALUMINUM
REYNOLDS METALS COMPANY · RICHMOND, VA.
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REYNOLDS METALS COMPANY · RICHMOND VA.
Mechanical Joining of Aluminum
REYNOLDS METALS COMPANY · RICHMOND VA.

3 new Reynolds Handbooks explain and illustrate various methods of fastening aluminum

These newest additions to the Reynolds Aluminum technical library belong in *your* library. All types of aluminum fasteners and fastening methods are covered in detail. Here is information that can help you select the most efficient, most economical method of solving your particular fastening problems.

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Reynolds Metals Company
P. O. Box 2346-NL, Richmond 18, Virginia

Please send me the aluminum fastening booklets checked below:

- ☐ "Screw Fastening of Aluminum"
- ☐ "Riveting Aluminum"
- ☐ "Mechanical Joining of Aluminum"

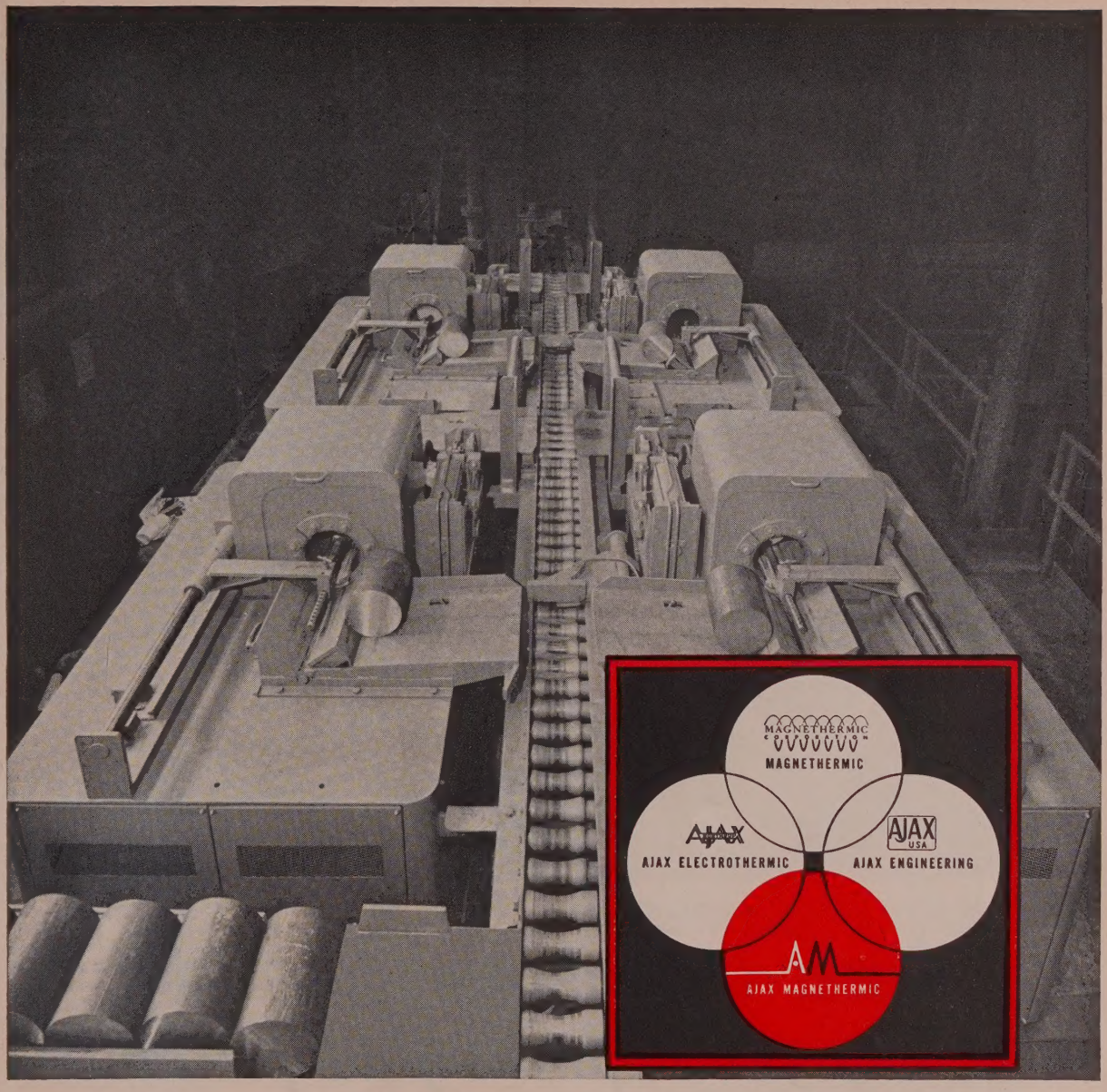
*Name*_____

*Firm*_____

*Street*_____

*City*_____ *Zone*_____ *State*_____

REYNOLDS ALUMINUM



At Scovill Manufacturing Company, Waterbury, Connecticut, these four Ajax Magnethermic Induction Heaters heat 9" x 16" copper and brass billets for a 2500 ton extrusion press at the rate of 60 billets per hour. Each heater is rated 450 KW. The four heaters in tandem are served by a common loading and unloading conveyor.

THE NEW NAME WITH THE FAMILIAR RING!

60-Cycle Induction Billet Heaters manufactured by AM, one of our many products for induction heating or melting of all types of metals.

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lower-cost aluminum sheet to help you improve your product

Now you can get immediate delivery on new lower-cost Reynolds aluminum building sheet—any size, any quantity—from large Ryerson stocks.

These sheets open many new opportunities for you to gain the advantages of aluminum without paying the higher price. For example, a company making electrical enclosures for exposed locations was having a problem keeping painted surfaces from peeling and rusting. This manufacturer hadn't considered aluminum because price seemed prohibitive.

A Ryerson specialist recommended a switch to new aluminum building sheet. No painting was required because these sheets won't rust—and resist corrosion indefinitely.

In hundreds of applications you'll find a definite price, product and profit advantage when you use new aluminum building sheet. And remember, Ryerson has worked with more companies in more applications of this new building sheet than any one in the industry. This is a background of experience that can best help you evaluate application possibilities in your operations. Get all the facts from your Ryerson aluminum specialist soon.

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MODERN METALS
Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

ON THE COVER: The various signs shown are a sampling of the production of Tel-A-Sign Inc., Chicago-based sign manufacturer which has combined aluminum with plexiglass in order to mass produce these attractive eye-stoppers. The firm has grown fast in the last 10 years, as has the entire industry. And such growth is important to aluminum. Tel-A-Sign itself, only five years ago, was using 12,000 pounds of aluminum annually. Now it consumes 260,000 pounds and indications are that its needs are becoming greater all the time. A complete report of this company's growth and operations starts on page 32.

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Modern Metals has by far the world's largest circulation among light metals fabricators, foundries and product manufacturers who use aluminum, magnesium, and titanium. Circulation: Now over 15,500 copies per month. Acceptance under controlled circulation at Barrington, Ill.

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PUBLISHER W. B. GRIFFIN

Modern Metals

VOLUME XVI **MAY, 1960** **NUMBER 4**

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Aluminum+Plastic Spurs Sign Industry ..... K. B. Rhodie **32**
Tel-A-Sign Inc. is a top-ranking member of an industry which was virtually non-existent 10 years ago. In 1955 the firm used about 1000 pounds of aluminum a month, now uses more than this in a day.

New Jobs for High Strength Honeycomb **43**
A West Coast manufacturer ferrets out new markets for all types of honeycomb core materials; introduces aluminum honeycomb 15% to 30% stronger than previously used alloys.

Aluminum Upgrades Design of Seating Equipment ..... H. K. Darby **46**
Aluminum is finding increasing favor at American Seating Co., the nation's leading manufacturer of "public seating." The firm uses comparatively little aluminum now, but expects its use in all types of seating to grow steadily in next five years.

Super Wire Holds Aluminum for Brazing **56**
A special spring wire is used in a clamping device needed when brazing electronic components. The clamp is like new after being used hundreds of times at 1100°F.

Extrusions, Castings in Big Aluminum Fan Blades **60**
A Philippine oil refinery will be the first air-cooled plant of its type in the Far East. Cooling will be done by 112 aluminum fans.

Surface Treatments and Finishes for Magnesium ..... J. S. Kirkpatrick **64**
In many applications, magnesium performs satisfactorily without a surface finish. Where a finish is needed a variety of treatments are available for nearly any service condition.

Extrusions Simplify Ceiling Grid System **74**
This patented grid system is fast erecting, requires no tools, can be dismantled with minimum trouble for repairs and replacements.

WELDING ALUMINUM—Part 1: General Welding Processes **78**
This first article of an extensive series on welding aluminum briefly describes most of the welding processes to be detailed later.

The European Approach to Aluminum Curtain Walls ..... E. Muller **84**
Typical curtain wall systems used in Europe, a brief history of curtain wall development, and the problems encountered in such construction are covered in this paper presented at a building symposium held by the Aluminium Development Association, England.

Aluminum Invades the Garden **88**
Modern, lightweight structures, designed by a leading landscape architect for Alcoa's Forecast Collection, demonstrate how aluminum can be put to use to make the average backyard more livable.

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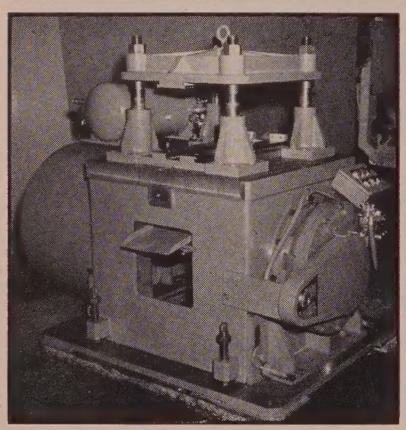


MRF Cut Off Press...

This cut off and notching press is available in 5 models: 8 to 50 ton . . . die widths from 9" to 20" . . . motors from 1 to 15 HP. Full wave rectification for closer moulding length accuracy. "MICHIGAN" is also a specialist in rolls and roll forming equipment. *Send for new brochure.*

Michigan Roll Form, Inc., 8950 Hubbell, Detroit 28, Mich., Phone VE 6-1844

MICHIGAN ROLL FORM

Letters

Those Aluminum Christmas Trees

Sirs:

Do you know the process as to how aluminum Christmas trees are produced? From what I've seen on the market, and knowing our facilities are far more extensive than others now marketing such trees, it would appear as though we could produce a like item.

Could you give me some information as to whom we could contact for the basic parts, etc?

"J"—R. I.

Sirs:

In a recent article in your magazine, mention was made of the increased market for aluminum Christmas trees. It would be most appreciated if you could provide us with a list of manufacturers and distributors.

"O"—Illinois

MM—There are about a dozen manufacturers of Christmas trees in the country, and we seriously doubt whether they would tell you anything about their process.

However, most of the aluminum producers—Alcoa, Reynolds, Kaiser, Olin Aluminum, etc.—are very much interested in this market, and it may be that they could supply you with the type of information you seek.

Big Steel And Aluminum

Sirs:

The Commercial Research librarian at United States Steel Corp. recommended MODERN METALS very highly to me and, inasmuch as I am not acquainted with it, I would appreciate your sending me a sample copy.

"R"—Pennsylvania

MM—When one of the big steel outfits tells another about a light metals magazine, aluminum has arrived.

A copy has been sent.

Wants Aluminum For Craft Groups

Sirs:

Can you tell us of one or several companies that are stamping aluminum flat plates and formed plates, crimped edging and uncrimped, that can be used by craft groups for mosaic tile setting.

"W"—La.

MM—Some aluminum distributors stock aluminum sheet for this purpose. You could try any of the larger distributor warehouses around New Orleans.

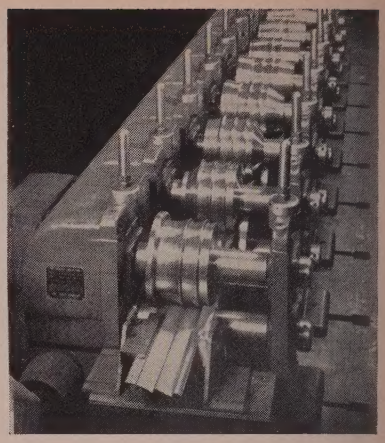
Missing Magnesium Welding Credits

Sirs:

You people did a fine job of condensing the magnesium welding article by Tom Patton (April '60, p. 46), but the omission of the acknowledgements of the work of other companies is embarrassing. . .

"C"—Michigan

MM—Here are the names of the companies that should have been credited—Mig Welding: Army Ballistic Missile Agency, ACF



Yoder Roll-Forming Equipment mass-produces shapes accurately, economically

Yoder Roll-Forming Equipment, even with part-time operation, can effect significant savings in many metal working applications and industries. Shapes, simple or complex, can be quickly and economically produced the Yoder way from a wide variety of flat-rolled coated or uncoated stock . . . in thickness up to ¾ inch . . . in speeds up to 50,000 feet per day.

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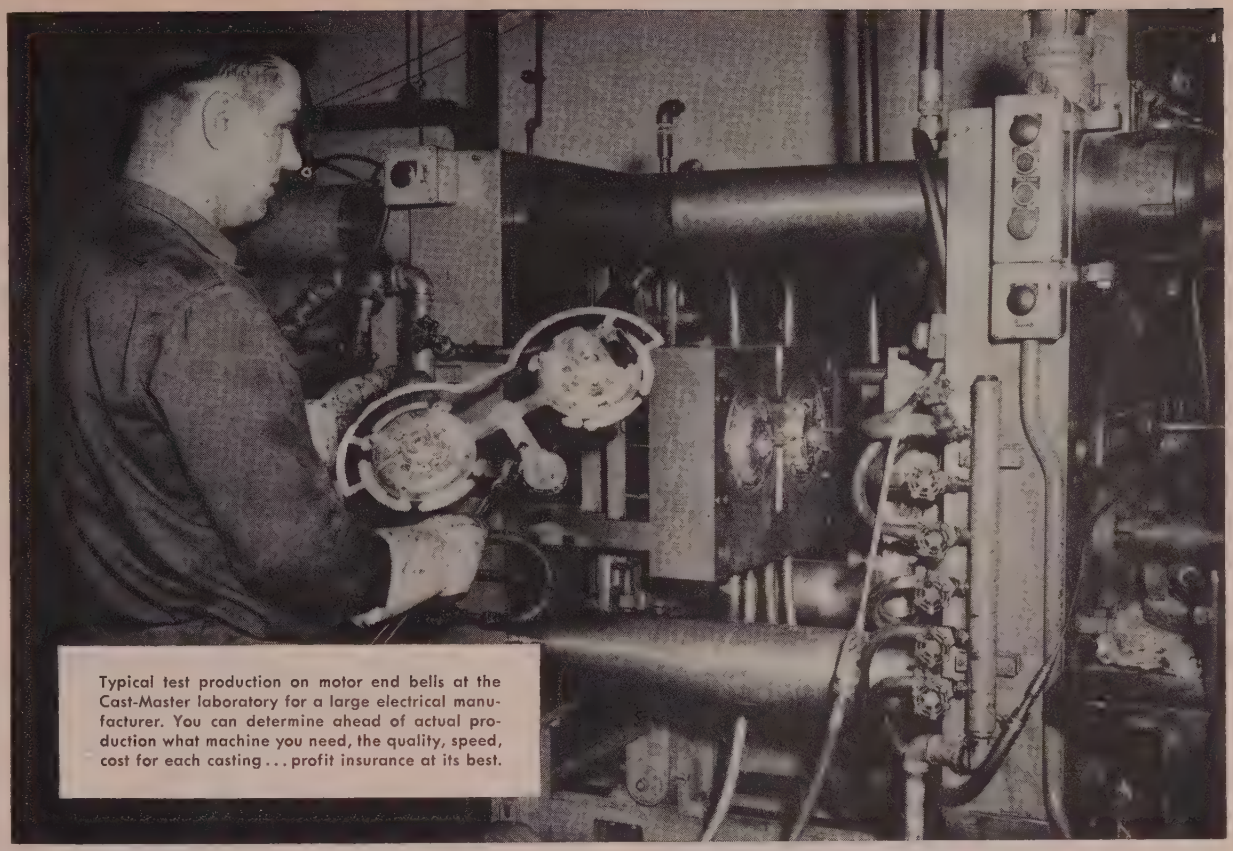
COLD ROLL FORMING MACHINES



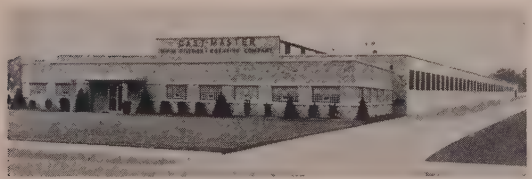
Typical test production on motor end bells at the Cast-Master laboratory for a large electrical manufacturer. You can determine ahead of actual production what machine you need, the quality, speed, cost for each casting . . . profit insurance at its best.

DIE CASTING PROFIT INSURANCE

Know The Quality, The Quantity and The Cost of Your Die Castings With Cast-Master's Simple Test Plan

Using your dies, and your materials, it is possible to make tests and die try-outs at Cast-Master's modern plant in Bedford, Ohio. Here's your advantage: Without investment in new machines, using the dies and material you plan to put into production, you can pre-test your die castings thoroughly. Cast-Master has the test lab, and there is no obligation. You have only to call to get complete information and arrange for an appointment.

The Cast-Master line includes 100-ton to 2000-ton models with a variety of interchangeable features for the most demanding hot or cold chamber jobs. It's the die casting line that gives positive mechanical toggle clamping, an efficient simplified hydraulic system, fast die set-up and a host of other production advantages you profit by using. Now, you can prove it without cost. For complete information on how to use the Cast-Master Lab Test Plan, call or write today.



This modern 72,000 sq. ft. Cast-Master plant in Bedford, Ohio, (Cleveland suburb) houses the finest machine tools and equipment for machine manufacture. Good transportation and close-by hotel accommodations will make your visit to Cast-Master a pleasant one. We'll be happy to make all arrangements for your stay.

H-P-M DIVISION-KOEHRING COMPANY

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- Reduction Drives
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- Guillotine Shears
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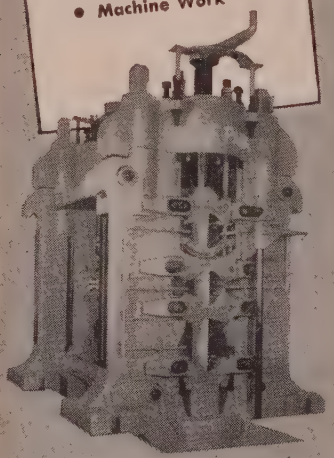
- Special Machinery
- Machine Work



For finer finish, long life and greater tonnage, specify Red Circle Rolls.

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The Aluminum Hearings

Sirs:

. . . I suppose MODERN METALS will feature a report on the Congressional hearings on aluminum that took place early this month.

"Y"—New York

MM—You're right. We had verbatim transcripts of the testimony made (440 pages in all), and are condensing the whole mess for a report in our June and July issues.

Mobile Homes And Pleasure Boats

Sirs:

I am interested in getting up-to-date information on the mobile home industry, and the small pleasure boat industry.

Do you have anything recent or can you tell me where to get same?

"W"—New York

MM—We published results of a survey and a comprehensive analysis of the mobile homes industry back in September 1957; haven't done much on the subject since then. Sorry, our supply of reprints has run out.

As for the pleasure boat industry, last month we published an analysis (including a survey) of the business, with particular emphasis on the battle between aluminum and fiberglas. We still have a few copies of the April issue available at a buck apiece.

Cooking Utensil Firm Needs Finishing Info

Sirs:

It is our intention to put a colour finish onto some of our products, and add a new line of business. We have obtained some epoxy-resin lacquers from someone in this island who had obtained the stuff from a U. S. manufacturer. The results of our testing show that the epoxy lacquer finish is all right, but we need:

a) a U. S. supplier who does not scorn doing business with us, as volume of lacquer we can handle at the initial period will not be very substantial.

b) some pointers on technical know-how so that we can do a truly professional job with as small a number of rejects as possible.

Would you therefore be so kind as to insert our inquiry in your pages. "Aluminum cooking utensils manufacturer in Jamaica wishes to do epoxy-resin lacquer colour finish. Will interested U. S. suppliers get in touch with Carib Metal Works, Ltd., Falmouth, Jamaica, West Indies. Good future prospects."

"H"—West Indies

MM—Some of our fearless finishes advertisers have been informed of your problem; are already swimming over with a jug of lacquer to get you started. So keep your eyes on the beach.

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1860-1960

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Most of the alloys, shapes, sizes and metals that Conklin stocks today weren't even known when we started to bring copper to market.

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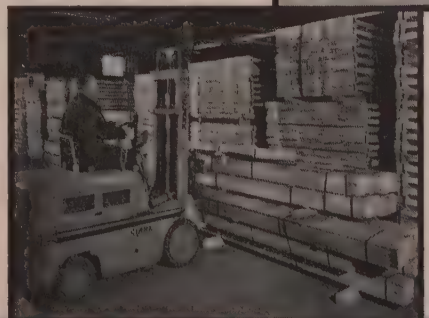
Today, we're the largest independent non-ferrous warehouse system in the United States. We handle millions of pounds annually and maintain one of the most complete stocks available anywhere in the country. Yet despite this phenomenal growth and the most modern of facilities, we still cling to one 19th century approach to business . . . that of personal, interested concern for our customer, be he large or small. That's why we say, whether it's brass, copper or aluminum you need, in whatever form, in whatever quantity, for quick friendly service — *"Call Conklin"* . . .

CUTTING AND SAWING DEPARTMENT . . . This ⅜" plate shear is typical of equipment in the department — equipment that makes it possible for you to get exactly the dimensions you require.

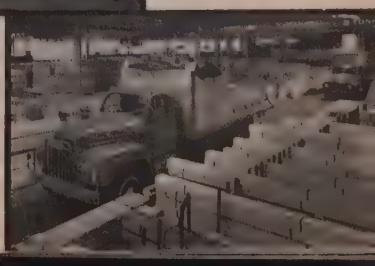
TWO OF OUR BATTERY OF MODERN SLITTERS, ranging from small to heavy duty, they make possible close tolerance slitting of brass, copper and aluminum strip to precisely the width you need.



MECHANIZED MATERIALS HANDLING . . . a fleet of fork trucks and heavy duty crane capacity speeds shipment of brass, copper and aluminum products.

NIGHT LOADING . . . Orders received during the day are processed by night shifts to guarantee next day delivery.

PART OF THE CONKLIN FLEET . . . the rest are out on the road, making sure that Conklin shipments are received "as promised" . . .



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All Non-ferrous Products

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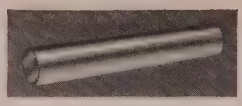

One company reports cutting 1600 pieces per hour from ¾" O.D. aluminum—pieces 6 13/16" long

HIGH LINEAL TOLERANCE PLUS 2 "LIKE POLISHED" ENDS

Lineal tolerance is guaranteed ± .010. This high degree of precision can be obtained day after day with inexperienced help. The small random cut at the left showed only .002" variation. Both cut ends had an approximate 45-55 micro finish.

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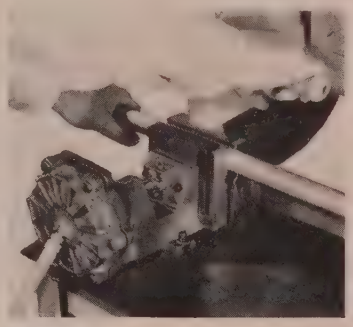

GET THE FACTS SO YOUR COSTS CAN BE REDUCED

Send for Wallace Cut-Machining literature or if you prefer, tell us about your specific problem.

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Here and There

Congressmen At Work » » The small business sub-committee headed by Representative Sidney Yates (D, Ill.) was doing business at the same old stand early this month. The parade of witnesses at this latest renewal of the aluminum investigations included some newcomers as well as familiar names such as Carl Burton of the Aluminum Smelters Research Institute, Leonard Starr of the Aluminum Extruders Council, Harry Sugar, president of Alsco, M. F. Garwood of Chrysler Corp., J. H. McConnell of Reynolds Metals, Lewis Favorite of Alcoa, and D. A. Rhoades of Kaiser Aluminum. Much of the subject matter had a familiar ring, too. Carl Burton contended that excessive exports of aluminum scrap threaten the livelihood of secondary smelters. A representative of the American Die Casting Institute complained that hot metal deals are encouraging auto makers to make more die castings themselves, thus buying less from job shop die casters. Harry Sugar and another siding manufacturer claimed that Alcoa put the squeeze on independents in the siding game when it entered into supply contracts with five major building products dealers. A foil converter declared that he and others in the florist foil business were being forced to the wall by unfair competition from Reynolds Metals, Kaiser Aluminum, and Reynolds Tobacco. And Leonard Starr asserted that the "price squeeze" by the primary producers bids fair to drive independent extruders out of business. Familiar as some of these charges are, they make interesting and instructive reading. We have verbatim transcripts of the testimony and are boiling them down for a special report in our June and July issues.

Can't Win 'em All » » Solid Aluminum mirrors can be a highly successful substitute for the conventional glass prisms in binoculars. As designed by John R. Miles, president of John R. Miles Co., Skokie, Ill., for 7x50 wide-angle binocs, the mirrors are produced from forgings, then ground, anodized to produce a 0.015-inch oxide coating, then ground again and polished to glass mirror-like reflectivity. After this they are coated with aluminum by evaporation while under vacuum, and finally the mirrors are coated with a transparent metallic oxide for protection of the surfaces. As conceived by Miles the binoculars give a large 11 degree field of view with full 60% illumination at edge of field. Bendix Aviation owns the patents, says Miles, but there is little likelihood that anyone will produce them. Flooded as the market is today with very efficient Japanese binoculars, no U. S. optical firms are bothering with the business. However, binoculars are only a segment of the general optical field (albeit a pretty sizable one) and it is hoped that Miles' aluminum mirrors will find application elsewhere.

Exotic Aluminum! » » Aluminum's new-found eminence in the automotive field makes us think of the relief pitcher who spent 20 years in the bullpen and finally saved a game with a sterling performance. Suddenly he's great. Aluminum, of course, has been around

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for 60 years or more and in fact *had* one or two chances in the auto field years ago. But to pursue the analogy, aluminum wasn't on the right team, then. Now that General Motors has called on the light metal for its Corvair engine, use in this application is bound to snowball. The daily press seems to take the view that aluminum is an "exotic" metal (the New York *Times* actually used the term, a week or so ago) which is bound to help sales in the years to come — particularly if R. S. Reynolds, Jr. proves to be right when he forecast that all major car manufacturers will have at least one aluminum engined line on the market in three years. Meanwhile, many foreign cars make good use of the light metal in engines. Even Rolls Royce (that's Bentley, too) has found it expedient to go to aluminum for its new V-8 engine. No doubt 1960 will prove to be the turning point for aluminum in autos.

The Surrealist's Friend » » Metal must have an exceptional fascination for Luis Ortiz. Fabrication of it is his daily bread and butter, yet it commands a growing role in his avocation. Ortiz is a talented painter who, after devoting 22 years to traditional forms, has turned to surrealism. He creates collages, those abstract compositions which use a variety of materials as a means of artistic expression. Using bare and anodized aluminum, stainless steel, newspaper, wood that is gouged across the grain, and oils, Ortiz produces abstractions that last month won for him a one-man show at Chicago's Feingarten Galleries and a certain amount of critical approval. Charles Feingarten, who has galleries in Chicago, San Francisco, New York, and Carmel, Calif., said Ortiz' work possesses a freshness and originality which make him outstanding in this field. Why do *we* mention Ortiz? Easy. He's helping to prove aluminum's tremendous versatility.

Lesson for Detroit » » A substantial market for a *small* compact car remains largely untapped as far as U. S. auto makers are concerned. Volkswagen and Renault keep rolling up new sales gains despite success of Ford's Falcon, Chevvie's Corvair, Chrysler's Valiant and AMC's Rambler. Apparently, U. S.-made compacts are cutting into sales of standard models, used cars, and higher priced imports, leaving the small car market for VW and Renault. Result: At least one U. S. auto maker will bring out a smaller car (under 100-inch wheelbase), perhaps as early as next year.

Aluminum's In » » Aluminum will loom larger as *the* material for engines in standard cars as well as compacts (see page 107). Less front end weight will open new avenues for designers; savings in machining will compensate for higher cost of aluminum. Also, auto men are convinced that new high silicon alloys will do the job. Aluminum should make inroads into other important auto parts — bumpers and brakes, for example — but may start losing out to plastics in decorative parts. A materials engineer at Ford recently forecast a 300-500% increase in use of plastics in cars in the next ten years. Others consider this prediction conservative. An American Motors man sees the average car using 60 pounds of plastics by the end of the 1960s.

Close Cooperation with New Industry sells H. K. Porter Co., Inc. on VIRGINIA

H. K. PORTER COMPANY'S new Disston Division plant at Danville, Virginia, contains 155,000 sq. ft. with working space for 350 to 500 employees. Site covers 20 acres with another 70 acres for possible expansion.

EVERY STEP OF THE WAY . . . from initial contact to opening of plant . . . was marked by close collaboration between the company, civic groups, public utilities. Porter officials were shown 18 sites in the area before making final choice.

"WE ARE EXTREMELY SATISFIED with the personnel that we have been able to employ in the Danville area," says Disston Division. "The Virginia State Employment Office was most cooperative in setting up our pre-employment testing."

The Disston Division of H. K. Porter Company, Inc., has long been recognized as a leading manufacturer of hand and power tools. For its new plant, Porter needed 20 acres on a major highway . . . 3,300 horsepower load of electricity . . . 400,000 gallons of water and 83,000 cubic feet of gas per day.

These requirements could have been met in many states. The deciding factor in favor of Danville, Virginia, was community cooperation. City officials met every possible request. Local banks helped in financing the plant. The records of other Danville employers were made available. Civic groups supplied Porter executives with kits of data on housing, cost of living, recreational and educational facilities, weather . . . even down to marriage laws!

Summing up their choice of Virginia, a Porter official said, ". . . good location for distribution of our products, favorable plant site, adequate labor and an extremely receptive community."

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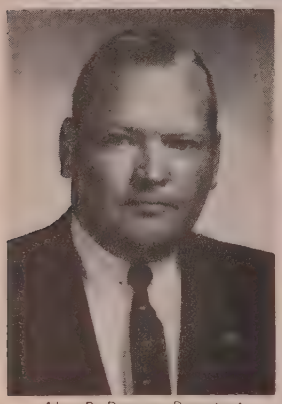
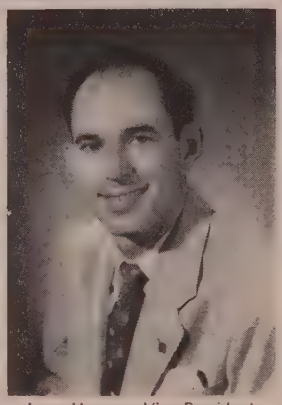


Alan P. Benson, President



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New Enterprise

Bensen Aircraft Corp., Raleigh, N. C., has a way to beat steaming summer traffic jams—**a one-man helicopter** that can cruise at 60 miles an hour and can be gassed-up at any service station. The copter, which has a 100-mile range with pilot and cargo, will cost about $7000, but you can make your own from a kit for less. The unit has an airframe of three straight aluminum tubes, and is powered by a 60-horsepower outboard motor.

Stockholders of Sunbeam Corp., Chicago appliance manufacturer, were to hold a special meeting April 4 to vote on a proposal to exchange 230,000 shares of common stock for the capital stock of John Oster Mfg. Co. and its privately held firms. Recent market prices held this Sunbeam stock at $13 million. Sunbeam wants to make the exchange so it can enter the **electronics** field. Oster manufactures electronic components and instruments in addition to barber and beauty supply items and health and household appliances. If the shareholders say "yes," Sunbeam would also acquire Racine Die Casting Co., Bojo Inc., Lydell Corp. and John Oster Mfg. Co. de Mexico S. A.

Seasonmaster Inc., **extruder** and manufacturer of aluminum products, has opened a new $2 million plant at 777 Main St., Westbury, L. I., consolidating here the operations formerly carried out in five plants. The structure has 100,000 square feet of working space, and houses extruding and anodizing equipment. According to Irving Schneider, president of the company, "An important reason for consolidating our manufacturing is the increased demand for our aluminum products. This makes it mandatory that we operate at peak efficiency."

May has been set as the starting date for the newly organized General Impact Extrusions Corp. The firm mainly will **impact extrude** aluminum in its new facility at 4852 W. Lawrence, Chicago 30.

As the nation's highway system worms its way across the country, the need for modern equipment to speed construction becomes more and more apparent. Construction Machinery Co., Waterloo, Iowa, may have an aid for road-builders—**aluminum concrete mixers** weighing one-third less than steel counterparts. This means greatly increased payloads, and fewer trips needed for a particular road segment. The new units are built of weldable alloy 5086, and weigh 4600 pounds, as compared to 7000 for a steel model. Aluminum concrete chutes weigh 60% less than steel, which eases operator handling. All parts of the mixer are aluminum except for drive and mixer controls.

Commercial, institutional and industrial applications are claimed for a new line of extruded aluminum weather-tight **louvers and louver penthouses** made by

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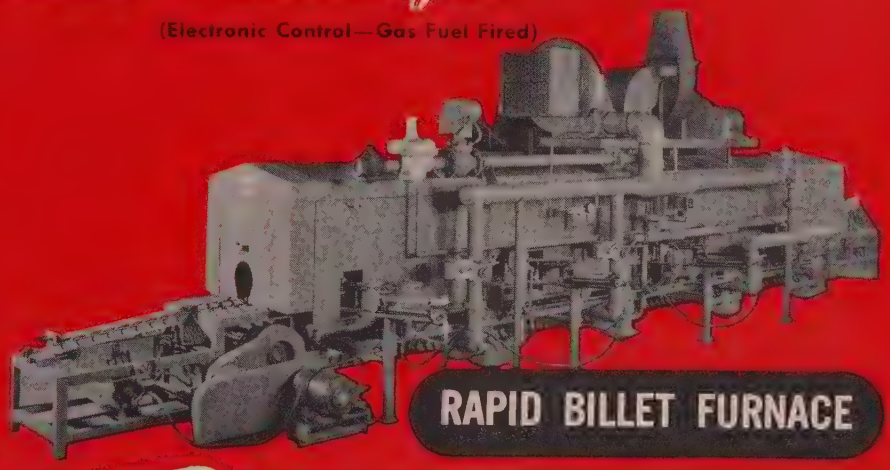
(Electronic Control—Gas Fuel Fired)



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Electrogas is easily adapted to any style or make of extrusion press; can be fired with any type of gas at far less operating cost than other heating media; does not require expensive water installations.

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Electrogas offers you many cost-cutting advantages—operating economy, low installation cost, low maintenance cost. *We have the installations to prove it—let us show them to you.*

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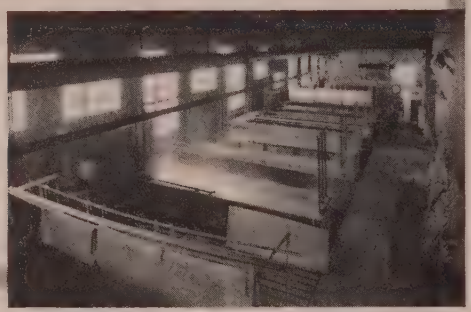

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E. Van Noorden Co., 59 Magazine St., Boston. Three types are available in both models: Adjustable, standard stationary, and stormproof stationary. In this type, baffles at the middle and top blades give added protection during extreme weather conditions. Adjustable model is manipulated by hand quadrant or chains with spring release.

National Rollex Corp. is moving into a new plant in the Centex Industrial Park at 1890 Lunt Ave., Elk Grove, Ill. The firm specializes in **roll forming** and serves the roofing and siding industry, providing all types of painted and unpainted accessories. The manufacture of additional items for the building industry, and special shapes for other industries on a contract basis, will be conducted at the new facility.

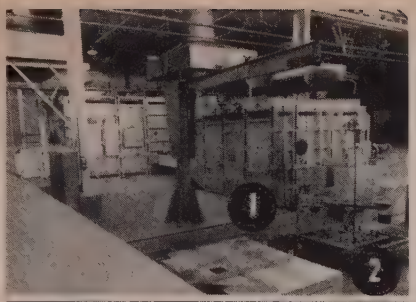
A. M. Castle & Co., distributors of aluminum and steel, has broken ground for the construction of a new **service center** on Miles Road, in the Bedford Heights section of southeast Cleveland. This will replace current leased facilities at 4510 Division Ave. Scheduled for completion in November, the center will have shearing, sawing and flame-cutting equipment, and decoiling, slitting, upcutting and roller-leveling facilities. The firm has slated its Galion, Ohio, service center for a May opening.

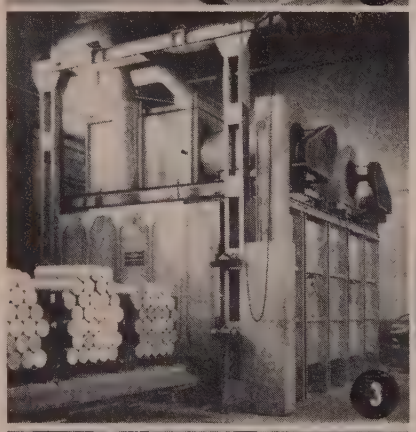
Here's something for the "woman who has everything." Tura Inc., Great Neck, Long Island, has unveiled a newly designed line of **aluminum eyeglass frames** which range in price from $150 to $2000 (the latter model includes 20 matched diamonds set in 14 karat gold mountings). Other Tura frames are also made of aluminum, then anodized and hand polished. According to Barton Levoy, vice president of the firm, "Using aluminum allows us to develop frames with much greater strength, and with a complete range of sparkling colors."

Another addition to West Coast industry is American Alloys Inc., a new manufacturer of automatic and cut alloy **welding wire.** The firm recently opened a modern 15,000-square-foot plant at Newark, Calif., near San Francisco. Its products include aluminum, magnesium, titanium, stainless steel and copper base alloy wires in spooled, coiled and cut lengths, and coated aluminum arc welding electrodes. Current production facilities include cutting, cleaning, automatic spooling and coiling machines and equipment for finishing operations such as flux coating of aluminum arc welding electrodes.

The West Coast **fabricating** and sales operations of the Container Division of Anaconda Aluminum Co. have been moved from San Gabriel to a new building at 2737 S. Supply Ave., Los Angeles 22. William Daly remains in charge of West Coast operations for the division.

Five 28-foot all-aluminum **skiffs** are under construction at the Chaffee Machine Co. boatyard in San Diego, Calif. The boats, to be used by fishermen who operate purse seiners, are made of welded plate and sheet sec-





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for aluminum heat processing equipment engineered to your specific requirements

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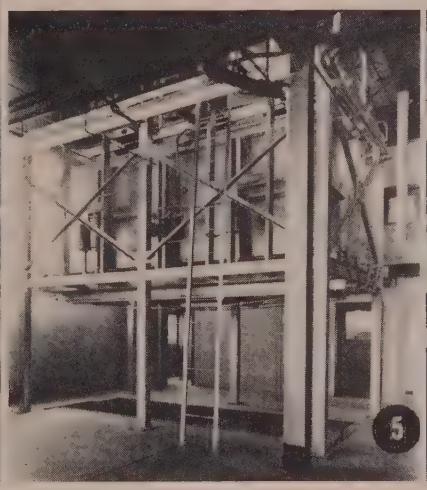

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If your operations involve the processing of aluminum — from billets to building products—you can profit from MORRISON'S quarter-century of experience in the industry.

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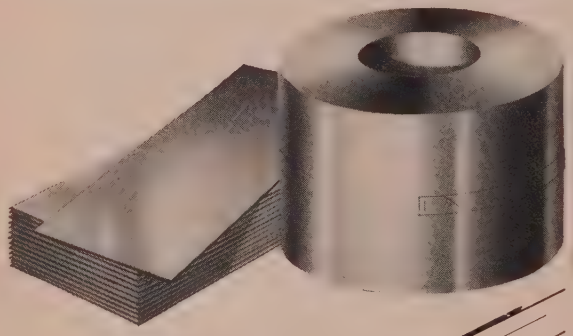

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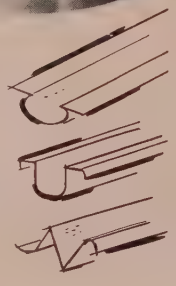

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tions of alloy 5086. Diesel engines will power the boats, which will be equipped with winches for net handling.

Storm Seal Industries Inc., manufacturer of aluminum **windows, doors and awnings,** has opened a new 36,000-square-foot plant at 22901 Aurora Road in Bedford Heights, near Cleveland. Barney Wolstein, president, says the plant is in full operation. The firm expanded its capacity by installing a 1000-ton press to extrude components for the company's own line of residential building products, and a variety of shapes for customers serving the appliance, building, electronic, furniture and transportation markets. Wolstein says production capacity has been upped 300%, and will permit the firm to ship approximately 2 million pounds of aluminum products annually.

A far-reaching industrial program is being planned by the Fairmont Aluminum Co., Fairmont, W. Va., a subsidiary of Cerro de Pasco Corp. The project, the initial step of which involves modernization and expansion of the firm's **strip mill,** was awarded to Loewy-Hydropress, Industrial Equipment Division of Baldwin-Lima-Hamilton. The program includes a two-stand tandem mill for hot and cold rolling, a single-stand cold mill, and all accessories. The first phase of the program is expected to be completed this year.

Alcoa has created a **Packaging Development Laboratory** in a move aimed at expanding its services to the packaging industry. Ross C. Reed, formerly manager of product development for Dobeckmun Co., a division of the Dow Chemical Co., is manager of the new operation. The lab will develop new production processes for aluminum packaging, and carry to the point of practical application the discoveries of the foil and packaging division of Alcoa Research Laboratories. The new facilities will also be available to customers to help perfect their own innovations in aluminum flexible packaging, closures, rigid containers, and cans.

Components for manufacturers serving appliance, building, electronic and furniture industries are now being extruded by the Acorn Aluminum Division of Hillman Mfg. Co. Acorn is producing **aluminum extrusions** (6063 alloy) in cross sections up to 4 inches in diameter on a new 700-ton press in its plant at 2020 N. Chico Ave., El Monte, Calif. The firm has also installed a furnace for ageing sections up to 26 feet long, and operates its own die shop at the same location. John Hillman, president, says the facilities "permit us to give rapid services in the Los Angeles area to manufacturers who seek precision accuracy and high quality in custom extruded shapes."

Alum-A-Seal Mfg. Co., Toledo manufacturer of aluminum **combination windows and doors,** will move all of its operations from Monroe St. to new quarters in the former Chevrolet plant on West Central Ave. The building has been purchased by a holding firm formed by the Willis Day Storage Co. Most of the building will be used to warehouse various products, but Alum-A-Seal will take over 90,000 square feet for its aluminum fabrication operations.

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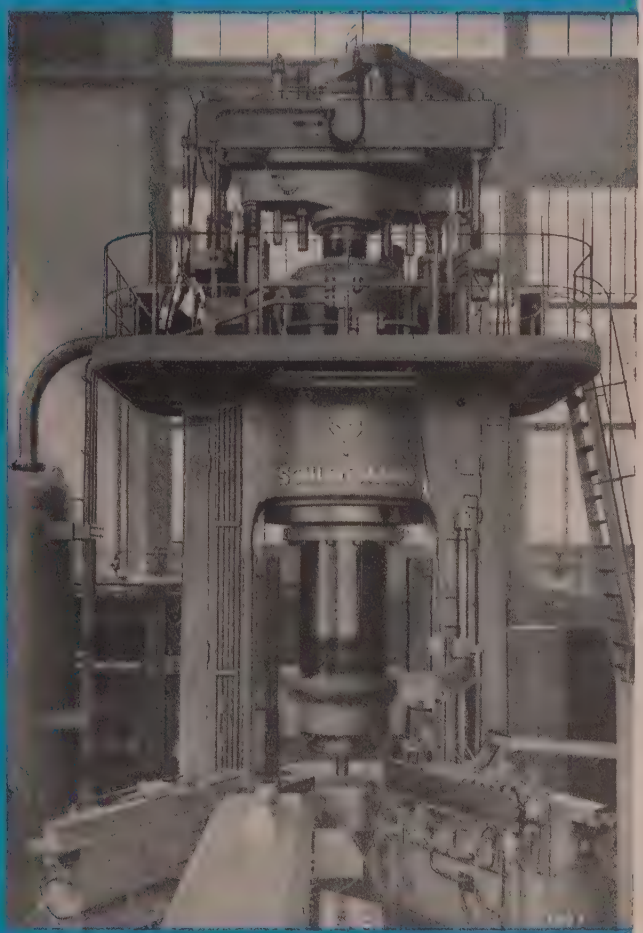
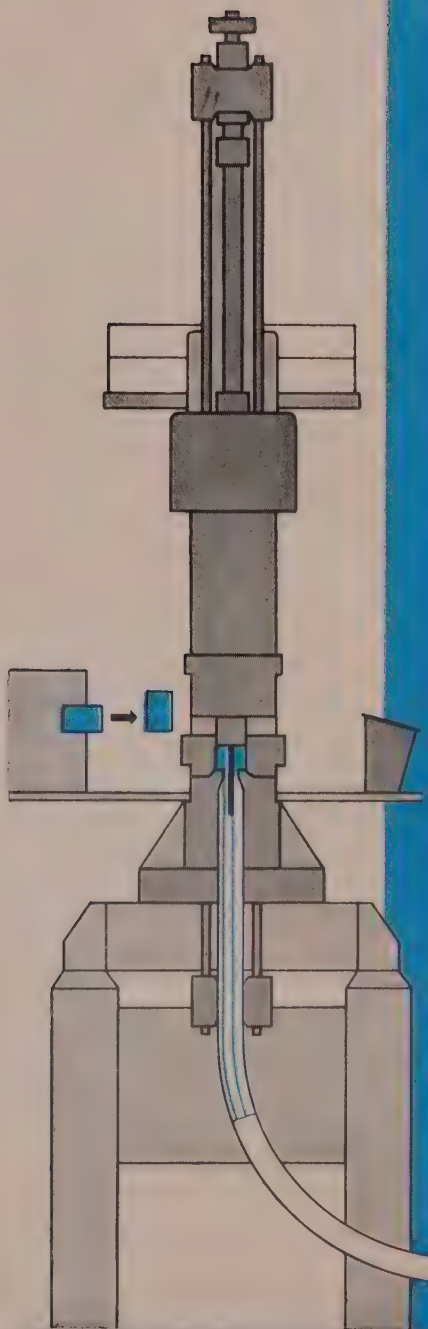
Extrusion Presses Automated





The fully automatic operating cycle of this vertical 1,375-ton tube and rod extrusion press also includes billet charging, loading and removing the dummy, as well as the scalping of billets, severing the butt, cutting and ejecting the extruded product, cooling mandrel, container, and die. Essential features of the press are covered by patents. Only one operator required. 31 vertical SCHLOEMANN extrusion presses equipped for manual or electro-hydraulic automatic control have been built within the past nine years. Latest SCHLOEMANN horizontal extrusion presses also feature fully automatic operating cycle.

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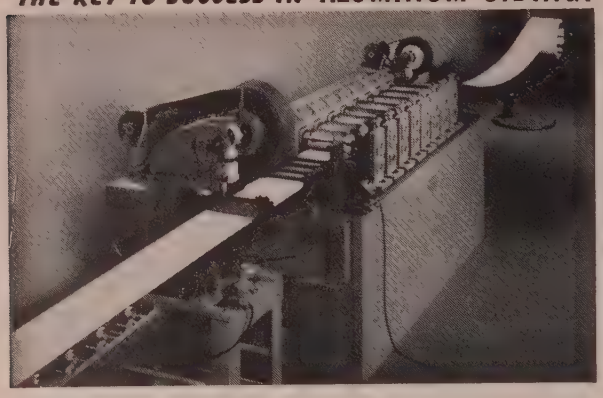

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Find out how practical and simple it is to become an Aluminum Siding Manufacturer with the Color Bound Method. This plan was developed by the foremost designers of Aluminum Roll Forming Equipment and encompasses all phases from simple manufacturing right through the ultimate sale to the consumer.

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Are you able to produce small extrusions or comparatively small runs profitably? If not we can help you because this is our specialty.

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Jerry Settles

President

"You run the big shapes . . . we'll run the small"

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Useful Data

Primary and mill products produced by Harvey Aluminum are described in a new technical brochure which reviews the full range of shapes, sizes and alloys available in primary aluminum pig, ingot and billet and wrought mill products. Complete metallurgical tables and design information are included, as are product applications, alloy characteristics and production facilities. Other listings are of light and heavy press extrusions, press and hand forgings, impact extrusions, pipe and tubing. For copy, write to Gene Alfred, Harvey Aluminum, 19200 S. Western Ave., Torrance, Calif.

A business index, "Directory of Firms, Their Buyers and Specifying Engineers," has been compiled by Industries Publishing Co. This 130-page book lists 1800 buyers and 1500 specifying engineers in the aircraft, missile, space and electronic industries and the military in the 11 Western states. Price: $25. Write James D. Volts, Industries Publishing Co., P. O. Box 621, Culver City, Calif.

Induction heating equipment of Ajax Magnethermic Corp. is illustrated in new booklet. Topics covered include billet heating for extrusion or forging; heat treating, annealing and hardening; joining, brazing or soldering; melting, vacuum or air melting; and sintering. Data includes selection chart for billet heaters, melting rates in pounds per hour; table of frequencies, and individual product specifications. Write C. C. Hanson, Ajax Magnethermic Corp., P. O. Box 839, Youngstown 1, O.

The hard coating process of Sanford Aluminum Processing Co. is described in a new bulletin. Examples show how it can be applied to die castings and used in the electronics field. Coating thicknesses possible and relative hardness produced are charted. Statistics show how Sanford treated alloys have withstood tensile, corrosion and abrasion tests. Three colors — gold, green, brown—can be produced without the use of dyes. For copy write Art Pollack, Sanford Aluminum Processing Co., Inc., 1330 W. Fulton St., Chicago 7, Ill.

Dust, dirt and mist collecting problems in the plant are discussed in catalog DK-820, by Hammond Machinery Builders Inc. The booklet tells how to get maximum usefulness from Hammond's line of contaminant collectors, and provides general application information. Installation recommendations are also given for specific situations in assembly, polishing and buffing departments, etc. Pictures, diagrams and floor plans are included. Copy can be had from W. C. Johnson, Hammond Machinery Builders Inc., 1609 Douglas Ave., Kalamazoo, Mich.

Extrusion dies produced by Supreme Extrusion Die and Tool Co. are traced from design stage through completion in a new folder. Photographs show how tem-

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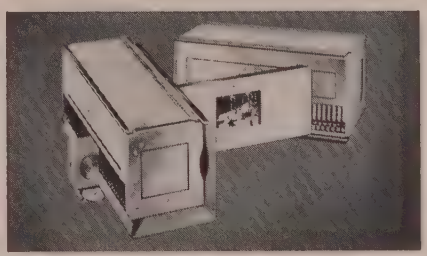
Airequipt Slide Changers Offer Fingertip Action For Quick, Easy Projection

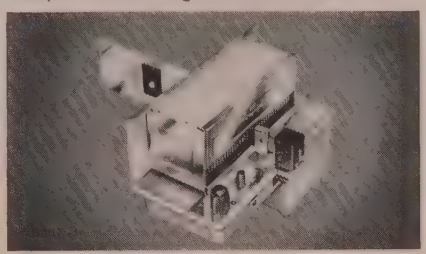
Airequipt slide changers are virtually all aluminum (alloy 5052-H32 sheet) for light weight, pleasant appearance and durability. Manual projectors can be converted to automatic slide operation with the Airequipt slide changer which changes slides in pre-selected sequence and automatically advances the magazine at the same time. This well known changer comes as original equipment on many of the world's finest and best known projectors.

For the ultimate in automation, Airequipt also produces an electric slide changer called *Electro-Changer*. Using the standard Airequipt aluminum magazine, the *Electro-Changer* operates electrically by itself, by push-button, or by remote control. It can be used with tape recorders that provide for slide-sound synchronization.

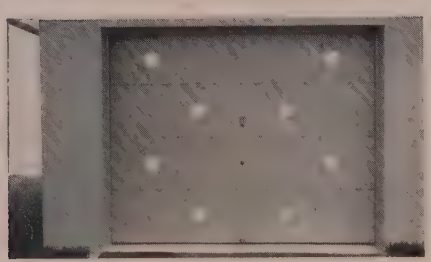
For complete information, mail the coupon below.



Airequipt slide changer comes complete with adapter and one magazine for 36 slides.



Airequipt Electro-Changer operates electrically by itself, by push-button, or by remote control.



Lifteez Doors Are 40% Lighter Than Standard Wood Doors

Lifteez Doors add beauty to any home. Their simplicity of design blends with any type of architecture. Also ideal for commercial and industrial use.

Lifteez Doors, manufactured by Burda Metal Industries, Inc., Hialeah, Fla., are made of heavy gauge, specially processed, stucco finish aluminum, bonded to a 1¾ inch-thick interior core of rosin-impregnated paper honeycomb. The result is a garage door 40% lighter than standard wood doors, yet strong and durable for rough usage.

The stucco aluminum finish on both sides is practical and attractive. The door won't warp, sag or rust—never needs painting, although it may be painted if desired. The honeycomb core offers insulating properties that save money on heat loss.

Other advantages gained through aluminum: weatherproof, resists moisture and decay; vermin resistant; fire retarding.

For complete information, mail the coupon below.

Please send me full information on the products checked below:

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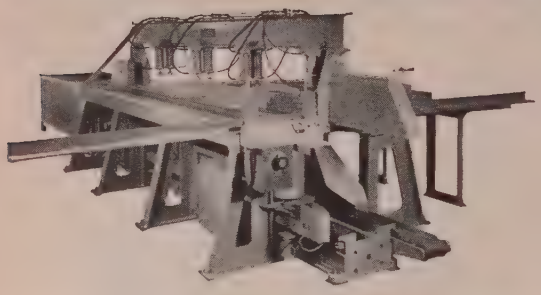
HEAVY DUTY PRODUCTION SAW
for precision cutting of plates and sheets of all sizes up to 6" thick



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For cutting aluminum, bronze, micarta, copper and other nonferrous metals . . . adaptable to individual requirements, yet provides economy of operation . . . satisfies rigid demand for accurate work and fast cutting. Send for illustrated folder giving full details.

OLIVER MACHINERY COMPANY
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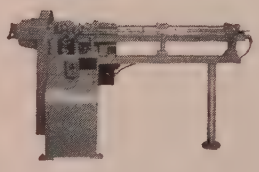
Now High Speed Straightening and Cutting of Fine Wire .020" to .080"

New SHUSTER
MODEL A
produces up to
12,000 pieces per hr.*



1. Capacity .020" to .080"
2. Geared to feed 125 F.P.M.
3. Electric trip mechanism on target
4. Solenoid-actuated roll-type clutch
5. High speed five die straightening arbor mounted on ball bearings
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The *New* Model A from SHUSTER, the *oldest* name in the trade, raises production sights for the most-used wire between .020" and .080" diameters. This *constant speed, electrically controlled* machine, with advanced engineering features, incorporates the same skill and care in manufacture that keep SHUSTERS performing at peak efficiency far beyond normal life expectancy.

Users report their *New* '58 Model A High-speed machines have already paid for themselves. Send us your wire straightening and cutting requirements from .020" to 11/16".

**12,000 pieces per hour based on straightening and cut-off of 6" lengths of .040" diameter basic bright wire. Applies to larger sizes also.*

METTLER MACHINE TOOL, INC.

plate is made, and how various parts are milled, filed, demagnetized, etc. Company capacities are given and samples of some of the hollow and solid shapes built by the firm are shown. Write Al Narbut for copy at Supreme Extrusion Die and Tool Co., 106 E. 10 Mile Road, Hazel Park, Mich.

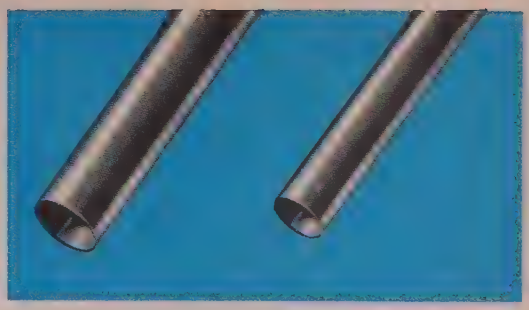
Photomicrography of metals is detailed for metallurgists in a new book published by Eastman Kodak Co. Material includes photographs, charts and graphs. Six sections cover the metallographic microscope, illumination, filters in metallography, photographic materials, exposure determination, and processing and printing. Optics of metallography are discussed and specific suggestions and recommendations for matching proper equipment to various applications are given. For copy send 60 cents to Pete Wentworth, Advertising Dept., Eastman Kodak Co., Rochester 4, New York.

Porcelain enamels applied to aluminum are discussed in a new guidebook by Reynolds Metals Co. The 22-page illustrated publication covers alloy selection, metal preparation, choice of frit, slip formulation, enamel application and firing. In addition, the book compares porcelain enameled aluminum with porcelain enameled steel. To obtain "Porcelain Enameling of Aluminum" write on company letterhead to Reynolds Metals Co., Dept. PRD-27, Richmond 18, Va.

Welding machines are pictured and described in flyer by A. O. Smith Corp. Those shown include a-c and d-c manual and automatic models, d-c gas driven and a-c/d-c inert arc models, and constant potential units. Also detailed is the company's carbon-dioxide-shielded automatic process, and the equipment needed for it. Accessory welding items such as hand guns, d-c converters, and power sources for multiple operator installations are covered, too. Write A. O. Smith Corp., Welding Products Div., Milwaukee 1, Wis.

Electrostatic spraying can now be performed with a hand gun. Developed for use with the Ransburg Electrostatic Number Two process, the gun is the subject of a new brochure. Pictures show what type of work the gun can handle, and a diagram shows how the process works. The type of coatings that can be applied, installation requirements and operating techniques are discussed. The firm also lists six advantages of its process. For copy write R. H. Stone, Ransburg Electro-Coating Corp., P. O. Box 23122, Indianapolis 23, Ind.

Designing with aluminum foil is discussed in a booklet by Anaconda Aluminum Co. Written for designers and others who are concerned with the use of aluminum foil for packaging, labels, signs, etc., it covers the design itself; preparing the comprehensive, materials and equipment, precautions, illustrations, mass presentations and production. Samples of work in full color are presented. Another book, "Lithographic Printing of Aluminum Foil," is also available. For copies of both books write Damen Tunnicliff, Anaconda Aluminum Co., Dept. LF-2, P.O. Box 1654, Louisville 1, Ky.



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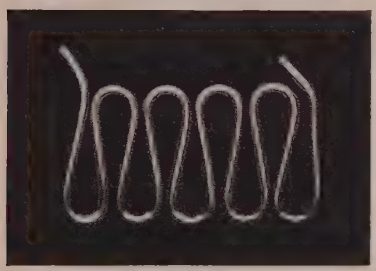
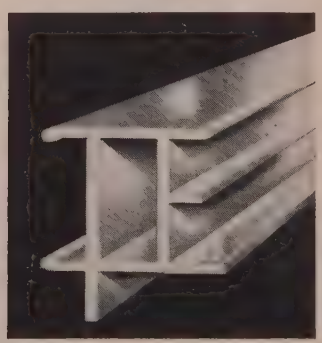
In Wolverine Tube you have an aluminum source with years of metalworking experience — one which places top emphasis on product quality and service reliability.

Wolverine produces both drawn and extruded aluminum tube as well as extruded aluminum shapes.

Wolverine tubing and shapes are manufactured in the following alloys: EC; 1100; 3003; 6061; 6062; 6063. Drawn aluminum tube is available in sizes from ⅛ inch through 2 inches O.D. Extruded aluminum tube is available in sizes from ¼ inch through 3 inches O.D.

We're sure you'll appreciate Wolverine's product quality and service reliability. May we have your next order? Write, too, for the Wolverine Aluminum Catalog. It is one of the most complete available . . . anywhere.





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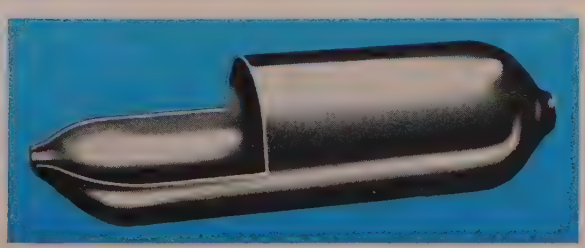

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES

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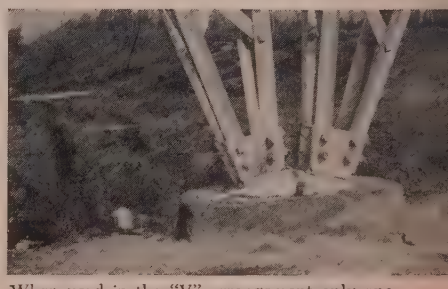
From Aluminium Limited research—an important

The ALCAN

ALCAN Aluminum Guyed Tower for 345 k.v. Chute des Passes PQ transmission lines. Structural aluminum weight—2400 lbs.

- Designed for installation on level ground . . . mountain or in swamp
- Weight savings of up to 80% due to the combination of efficient aluminum design and the guyed-tower principle
- Lightweight components are readily transported by panel truck, motorboat, helicopter . . . easily carried by hand
- Tower can be raised by one crew in minutes!
- Offers all the maintenance economies of aluminum



When used in the "V" arrangement only one footing and four inexpensive guy anchorages are required—eliminating the need for precision in footing work. Side-hill problems of leg extensions are nonexistent.

new application for aluminum extrusions

Aluminum Guyed Tower

—a revolutionary new high-voltage transmission structure that "makes molehills out of mountains"

The ALCAN Aluminum Guyed Tower brings substantial economies to the construction of high-voltage transmission lines.

The new unit—designed for "V" or parallel leg erection—has been created by ALCAN engineers to take full advantage of aluminum. The resulting combination of lightweight metal and the guyed-tower principle has many advantages over rigid conventional types.

Versatile Application

Particularly well suited for single-circuit lines, the ALCAN Guyed Tower is adaptable to all types of terrain without the additional costs normally expected with adverse footings and side-hill conditions.

Economical Installation

A primary advantage of the new tower is a weight reduction of up to 80% less than the rigid steel principle. This results in lower installed costs through lower transportation expenses . . . lighter erection equipment . . . simpler footing alignments . . . reduced erection time.

Easily Handled

All ALCAN Guyed Tower components can be delivered to the erection site with no need for special carriers or heavy lifting gear. Lightweight 20-foot leg sections weighing less than 200 pounds and major cross-arm pieces are readily handled by workmen without need for auxiliary equipment. This permits inexpensive yard assembly of a major portion of the tower before distribution to the tower sites.

Simple Assembly

Depending on the height required, only six to ten standard leg sections and a cross-arm go to make up each tower . . . sections can be quickly joined during ground assembly of units.

Single or Twin Base Erection

The ALCAN Aluminum Guyed Tower can be erected on a single base in the form of a "V" or on twin bases as a portal type, whichever style best suits conditions of terrain and right of way.

Fully Tested Design

Ultimate load tests on components as well as on complete towers have been carried out to establish the behavior of this arrangement and to confirm design principles. Special footings and guy anchorages located in marshland, loose sand, packed earth and rocky terrain have also been tested to full design loadings.

This development and test program resulted in the installation of four guyed towers in the ALCAN 345 k.v. Chute des Passes transmission system. Ranging from 76 feet to 96 feet from base to cross-arm, two are located on rock and two were installed in a swamp.

Uses Special High-Strength Alloy

The new ALCAN Guyed Tower is made of another Aluminium Limited development—ALCAN B51S aluminum alloy, which keeps costs low through a combination of high structural strength and good formability. Like all aluminum structures—maintenance costs are minimum.

Aluminium Limited

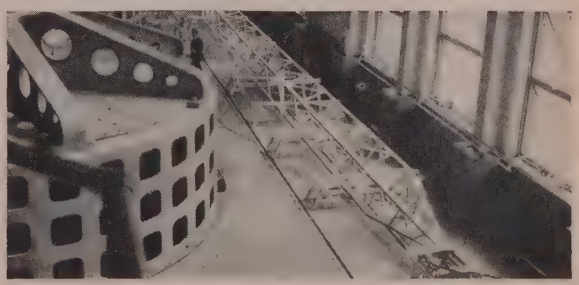
ALCAN

INQUIRIES FOR ADDITIONAL INFORMATION SHOULD BE ADDRESSED TO

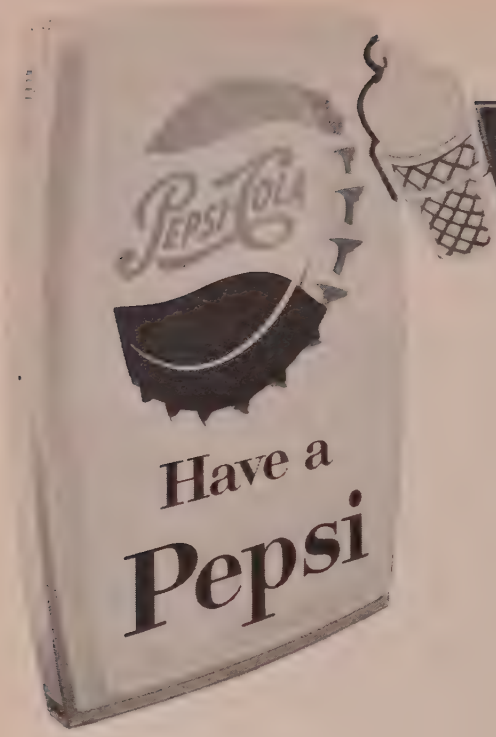
Aluminium Limited Sales, Inc.—630 Fifth Avenue, New York 20, N. Y.

CLEVELAND • CHICAGO • LOS ANGELES • DETROIT • ATLANTA • ST. LOUIS

ALCAN Aluminum Guyed Towers over 100 feet in height have been raised in less than seven minutes from preassembled position on ground using standard pole-line truck and rigging. In rough terrain tower can be erected in large lightweight sections.



ALCAN Guyed Towers were subjected to tests by Aluminium Limited at Isle Maligne, Quebec, Powerhouse, with single legs up to 96 ft. in length, under loads of 93,000 lbs.



tastee-freez

Aluminum-Plastic Combination Spurs Burgeoning Sign Industry

by K. B. Rhodie, Associate Editor

TALK about success stories!

Here's one about a sign manufacturer who tripled his sales from $830,000 to $2.6 million in five years, and has geared up to gross $5 million in 1960. And in racking up this solid growth record, Chicago-based Tel-A-Sign, Inc. has hiked its use of aluminum from about 12,000 pounds in 1955 to some 260,000 pounds annually today.

It started back in 1950, when A. A. (Bill) Steiger decided to switch from the lighting fixture business to the manufacture of illuminated signs. He set up shop with five workers in a "plant" covering 1080 square feet.

According to Steiger, president of the firm, the real impetus for his business came from plastics manufacturers who were looking for a big commercial market for their products. Until shortly after World War II, plexiglass was used extensively by the aircraft industry. But as aircraft production was cut back, the market began to dry up. Plastics producers reasoned that larger, more colorful illuminated signs would hypo business if they could be made economically.

The real spark to his business came when Steiger designed aluminum extrusions into the sign framework. Steel did not make a good running mate for plastic. Plexiglass is an easily formed, relatively light material that lends itself to bright color, yet is not prone to deterioration through weathering. Steel is just the opposite – heavy, difficult to work, and requiring much maintenance. The obvious alternative was aluminum.

Steiger says his aluminum experiment was not readily accepted by others in the infant industry. They didn't consider aluminum strong enough. But Steiger stuck to his idea that it was the proper metal to combine with plastic

A. A. Steiger

■ *"We started the business in 1950 as a pioneer in illuminated plastic signs. This industry was virtually non-existent. Since then, it has grown into an $80 million a year business, and our move and expansion reflect this huge growth."*

—"and now the entire industry has switched to aluminum."

In addition to its other favorable physical properties aluminum's ability to be extruded and anodized weighed heavily in its favor. The extrusions help cut labor operations needed for steel.

Example: A double-F extrusion used for some signs requires no fabrication other than cutting to size. When steel was used, six operations (performed by expensive personnel) were needed to get the same shape. Steiger says the elimination of these six steps far outweighs the additional cost of aluminum.

Anodizing, of course, makes signs more durable and corrosion resistant, while the color available through the process is of prime importance to an industry built on its ability to produce attractive eye-stoppers.

Another Tel-A-Sign innovation, perfected in cooperation with Anheuser-Busch Brewing Co., was the production of signs with swing out faces (see page 34). This permits the plastic face to be opened away from the frame for easy access to the enclosed electrical components, lamps, and other parts. Such signs are also more versatile since the bottom of the swing-out frame can be removed, the old face slipped out, and one of a new design inserted.

The main obstacle for the new plastic-aluminum sign was the already established neon sign. As well accepted as these displays were, however, sign users seemed eager to be converted to the latest developments. There were two

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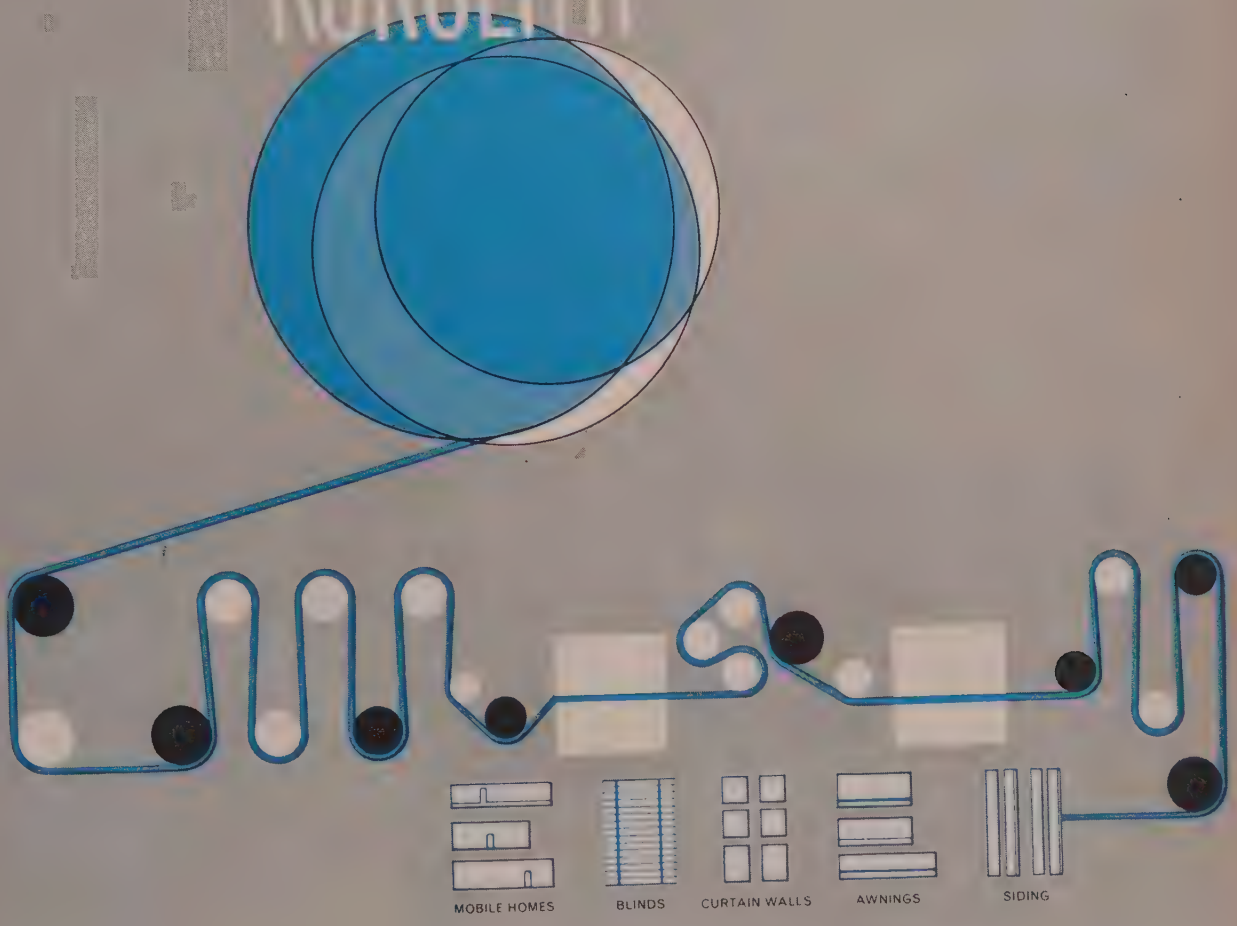

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combines the seasoning of experience with the vigor of far-sighted research. Long a supplier of basic coatings and finishes to American Industry, DeSoto has pioneered in new and advanced uses of finishes for metal products . . . tested and proven in DeSoto laboratories, among the largest in the nation. Today DeSoto leads in supplying industry tested coil coatings that retain their original beauty. You can depend on DeSoto coil coatings to withstand the strain of fabrication without deformation, marring, loss of adhesion or formability. In today's swiftly advancing technology, new types of coil coatings are constantly required. DeSoto's vigorous research and production teams all over the country* are maintaining our tradition of looking into the future—and being ready for each new challenge from American Industry. Our field engineers will gladly call to give you the details on ACROPON, the proven thermosetting acrylic featuring maximum durability, excellent forming properties —and KOROLITH, a superior baking finish for specialized end uses.

DeSoto Executive Offices, 1350 S. Kostner Avenue, Chicago 23, Ill., Phone ROckwell 2-5000.

(*) Divisions: Greensboro, N.C.; Philadelphia, Pa.; Joliet, Ill.; Chicago Heights, Ill.; Chicago, Ill.; Kansas City, Mo.; Garland, Texas; Berkeley, Calif.; Los Angeles, Calif.

reasons: Plastics presented a pleasing, colorful face; and when combined with aluminum helped cut costs of construction, transportation, erection and maintenance.

"The plastic sign, because of the pliancy of the material, offers an excellent medium for faithfully reproducing brand identifications and escutcheons in full shape, in three-dimension and in full color," Steiger points out.

In the very beginning of sign construction, a plastic manufacturer spends about 25% less on materials than a neon sign producer. But this is only the start; economies keep piling up throughout production.

Low Shipping Costs

Shipping cost is reduced; plastic-aluminum signs weigh less than neon. A 3-by-6-foot plastic sign weighs about 120 pounds, while a comparable neon sign weighs between 275 and 300 pounds.

Because of its fragile tubes, the neon sign's damage rate during shipment is high. Because of these factors, the cost of shipping a plastic sign is estimated at one-fifth that of a similar neon unit.

Light weight aids erection, too, with lighter installation equipment needed, as well as less bulky hanging accessories.

A major factor in the acceptance of the plastic-aluminum sign is its lower maintenance requirements. A spokesman for a large beer distributor, who provides its dealers with signs and maintains them, has this to say: "The average outdoor neon sign costs us $40 to $60 per year for maintenance. Annual costs on our present plastic-aluminum signs run about $15, including two washes and a complete relamping every 18 months."

Still another factor favoring plastic-aluminum signs is their sturdiness. Both the corrosion resistant materials used produce an outdoor unit that can withstand winds up to 100 miles per hour. Finally, plastic signs use fluorescent lamps which require about one-third as much power as neon.

The major customer for plastic-aluminum signs turned out to be the large company which had dealer outlets across the country. Examples are beer firms, oil companies, appliance manufacturers and producers of soft drinks (see front cover). They all needed signs that could be economically manufactured, inexpensively shipped, and cheaply maintained.

Because of the mass coverage of visual advertisement offered by magazines and television, these large companies wanted point-of-sale signs that would serve two purposes: Tell the consumer that a certain location carries the manufacturer's product; and to give important repetition of the brand identification image created by mass advertising in all parts of the country.

These facets of the new sign industry have led to an unusual type of business. Joseph M. Kearns, treasurer and controller of Tel-A-Sign, refers to the industry as one built on "customer contract orders."

"Signs are built to the custom specifications of the individual customer," he notes, "but are produced in quantity for national distribution." This allows the customer to control at a single production point all phases of sign design, manufacture, distribution and installation on as large a scale as needed.

Neon Used Locally

Kearns added that because of the advantages of plastic in reproducing the unique trademarks of manufacturers, and because signs can be mass produced and distributed at a fraction of the cost of neon signs, neon is becoming confined to use by local businessmen on an individual basis. The number of national sign users displaying neon units is becoming extremely limited.

A few more facts about Tel-A-Sign itself demonstrate how rapidly the neon obstacle was scaled. After its modest start, the firm felt the need to expand. In 1955 it moved into a 40,000-square-foot plant. Three years later it moved into a 72,000-square-foot facility. And in February of this year another move was made, this time to a 132,000-square-foot factory which is already being expanded.

While the moves were being made, the five-man staff swelled to more than 240. Tel-A-Sign also was adding sales offices in principal cities; now has 25 of them.

According to Herbert Hellmer, estimator of methods and procedures, the firm is using half a ton of aluminum per day to turn out 75 to 100 outdoor signs, and about 500 indoor signs. The factory is being geared up to produce more than 100 outdoor signs per day and consume 1500 to 2000 pounds of aluminum.

"Aluminum extrusions have played a large role in developing this burgeoning industry," Hellmer emphasizes. "They have speeded its advancement because extrusions permit the economical manufacture of a beautiful sign in the face of rising labor costs."

Aluminum Preferred

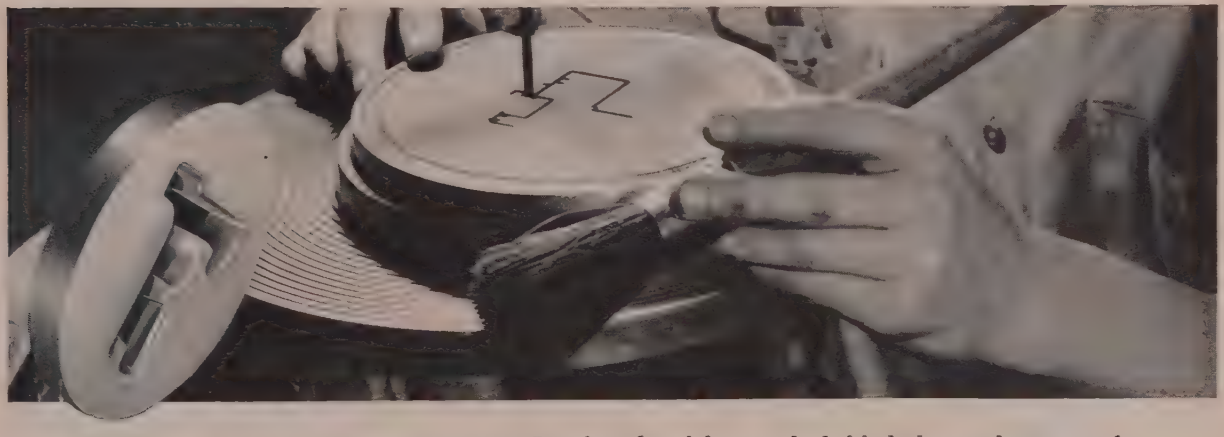
Aluminum is the preferred material for sign manufacture because it lends itself to radius forming better than steel does, and because an extrusion has a "straight line beauty that steel does not possess," he adds. This beauty is an advantage to salesmen, who have an easier time selling the aluminum-framed product.

One of the early manufacturing problems disclosed by Hellmer was that the nationally distributed signs had to pass the various city codes throughout the country. To avoid this problem, Tel-A-

■ *Signs with swing-out faces were an innovation with Tel-A-Sign, and were developed in cooperation with Anheuser-Busch Brewing Co. By having faces that swing out, above, workmen have easy access to interior for repairs on lighting equipment, washing, and other phases of maintenance. This sign has a steel frame and a blue anodized aluminum skin and face trim.*

. . . experience makes the difference in

EXTRUSION DIES



It takes the right people behind the product to make a product of quality, and the extrusion dies manufactured by PMD are quality because behind their manufacture is the time-tested experience of specialists . . . PMD EXTRUSION ENGINEERS.

These specialists have not only the theoretical practice, but have on-the-job practical experience as well. They are skilled in every phase of extrusion dies, from design service to tooling function. From simple dies to the most complex dies. And remember, a PMD Extrusion Engineer is available to anyone having tooling problems. Call or write today.

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Sign selected the city with the stiffest requirements (Chicago) and made signs to its specifications. All signs are also approved by Underwriters' Laboratories Inc.

The production of a plastic aluminum outdoor sign involves many operations, beginning in the design department. Here, the customer meets with Tel-A-Sign designers to discuss requirements, such as type of trademark, colors, and the like. After rough sketches are drawn and approved a detailed rendering is prepared, as is a blueprint of frame and interior sign construction.

When actual work starts, the printing department prepares proper silk screens while a hand-made sign frame is readied by the model shop. Revisions, if necessary, are made, and manufacture begins.

All-Aluminum Frame

The following sequence describes the production of a sign after it has passed the design and model stages. This sign, produced for the Texaco Oil Co., represents two firsts for Tel-A-Sign: The first time the firm has done production welding of aluminum, and the first all-aluminum sign the company has manufactured. (All of its other outdoor signs have welded galvanized steel interior supporting frames and shells or skins of anodized aluminum extrusions.)

All extrusions are 6063-T5 alloy supplied by Alcoa, Bohn Aluminum & Brass Co., and Precision Extrusions Inc. Anodizing is done by Light Metal Processors Inc. and Bee-Right.

Texaco's signs are of modular construction. Six separate swing face signs, each bearing a letter of the company's name, are made and later set on a steel channel at their location. Several phases of production are started simultaneously, with components ultimately converging on the final assembly line.

Welding comes into play in sign construction. Here, weldor joins galvanized steel angle irons to form internal support for sign which will be given an anodized aluminum exterior. TIG welding is used to join aluminum extrusions in manufacture of Texaco modular signs, which need no internal steel frame.

Each module has a frame composed of three aluminum extrusions. The main shape, which forms the outside skin and is combined with another section to form lamp boxes and electrical raceways, is 10 inches wide and ⅛ inch thick. In order to avoid using an interior steel frame, two 1½ inch structural ribs were incorporated into the extrusion.

First, these skin extrusions are cut to size at a 45 degree angle on DeWalt saws equipped with non-ferrous blades, and using a wax lubricant. Then, cut pieces are pierced on a Whistler machine for later bolting, degreased, and shifted to the welding department.

In this section the four sides are fitted together and jigged top and bottom. A temporary mild weld is made along the outside edge of each corner to hold the frame together while it is unjigged to make room for another. The frame is then moved to the second station for permanent welding.

Here a weldor makes a 5/16-inch fillet weld on the inside of each joint using a Linde 3/32-inch Oxweld 67 aluminum filler rod. The angle joints where the structural ribs meet are then welded on both sides for extra strength. Manual welds are made with a Linde Heliarc (TIG) torch powered by a Miller Electric machine. After welding the initial outside weld is ground so it doesn't show.

While the above operations were taking place the second extrusion used on the frame was being sawed to size (square ends), then pierced. This second extrusion was designed to slip over and snap onto the two 1½ inch structural ribs of the first extrusion, thus forming raceways. One such extrusion is bolted to each side of the already welded frame.

Top and Bottom Completed

Next, the inside top and bottom of the frame are completed. The top is covered with aluminum sheet that has been notched and formed to give a tight fit. Aluminum sheet for the bottom is secured and one ballast box is attached on top of the raceway on each side of the sign. Ballast wires are covered with standard General Electric teepees.

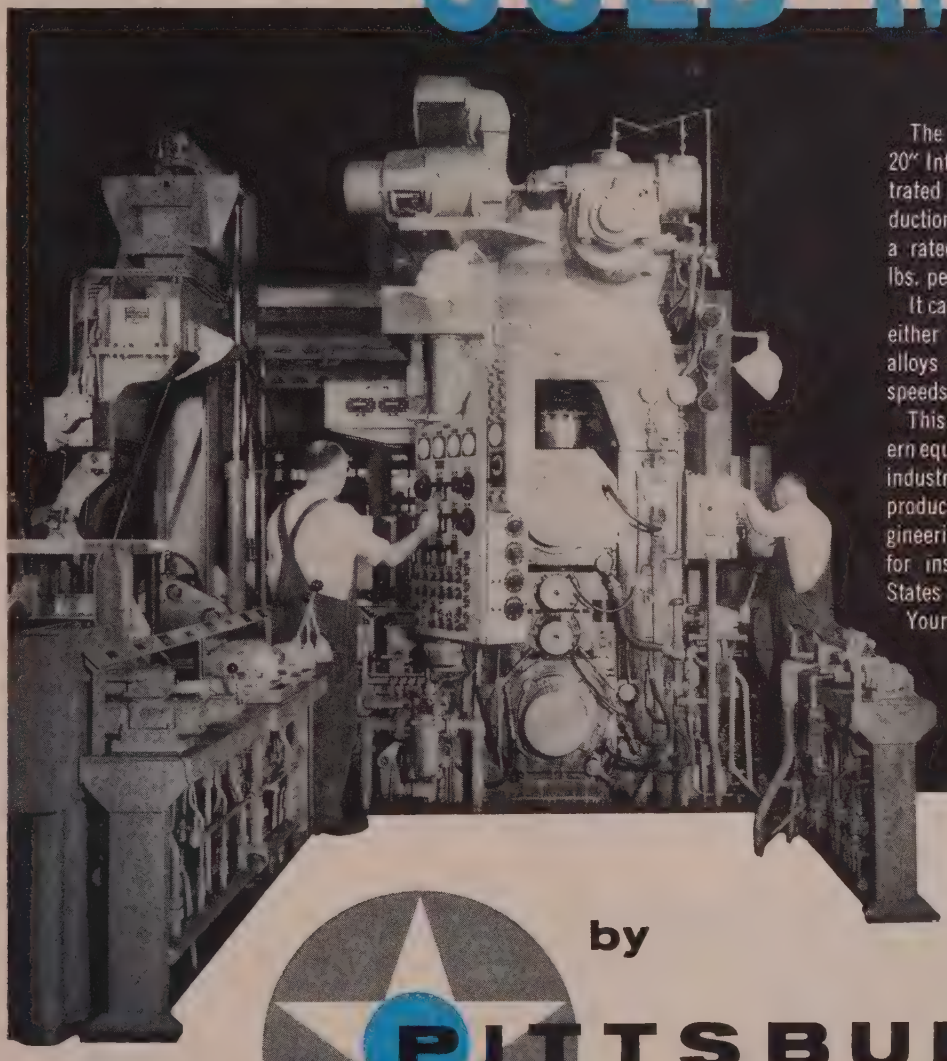
The frame is now ready for assembly.

During frame construction the swing face frame was assembled. This consists of four U-channel extrusions cut at 45

Workmen above are sliding sign face into air-circulating oven for heating prior to forming. Design has already been applied to clear plastic sheet via silk screen method. At right, formed face is being removed from 10 by 12-foot, 1200-ton press. Next, back up colors will be sprayed on inside of face, followed by a white paint, which aids illumination.

4 High Non-Reversing

COLD MILL



The Pittsburgh 8½" x 24" x 20" Intermediate Cold Mill illustrated is now in continuous production in the Chicago area with a rated capacity of 18,000,000 lbs. per year.

It can be used for reduction of either non-ferrous or ferrous alloys at your required rolling speeds.

This mill is typical of the modern equipment for the rolling mill industry now being designed and produced by Pittsburgh Engineering and Machine Division for installation in the United States and other countries.

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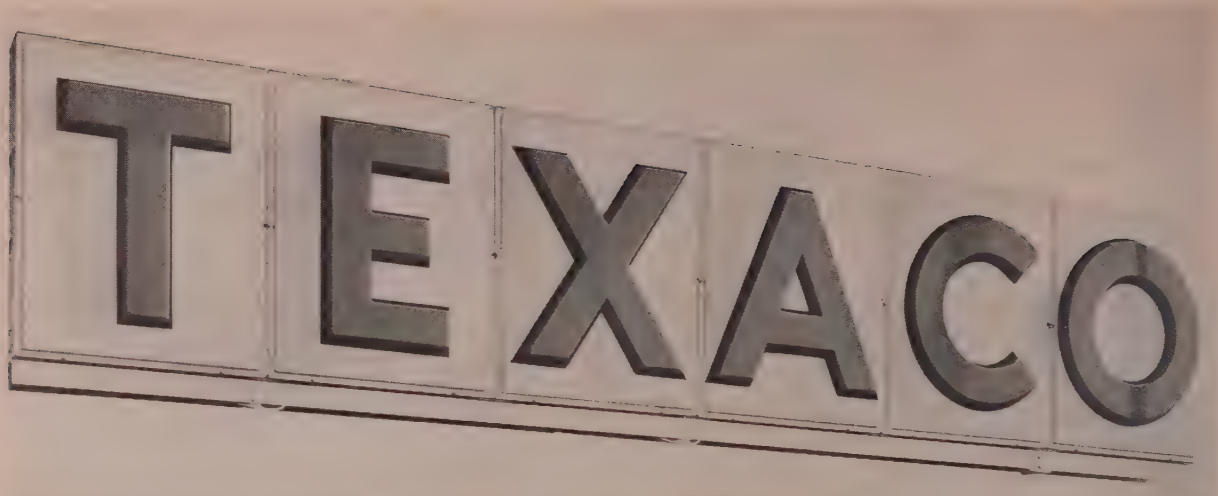


■ *This is actually six separate signs. Each letter is made and framed individually, then placed in a steel channel, as above, at its location. When installed, the sign is 5½ feet high and 27½ feet long. Its entire frame is of welded aluminum extrusions. This sign marked the first time the firm has done production welding of aluminum. TIG process was used to make fillet welds on inside of corners of each module. The sign has letters on both sides.*

degree angles. The top two angle-joints are TIG welded, while the bottom bar is bolted in place so it can be removed for insertion of the plastic sign face. This face trim follows the frame to the assembly line.

Plastic Face Prepared

While the shop was preparing the two frames, the sign face was being made. Letters are formed from red plexiglass sheets supplied by Rohm & Haas Co. Sheets are first oven treated then pressure formed using male and female molds on a 10 by 12 foot, 1200 ton press, claimed to be the largest of its type used in the industry.

Two red letters are formed from the same sheet, cut out, and cemented to a white translucent background. Each sign segment is 5 feet 6 inches high and 4 feet 6 inches wide. With all segments mounted the sign extends 27½ feet.

As completed sign faces arrive at the assembly line they are inserted in the face trim, and the bottom bar is bolted in place. This swing face is then hinged to the frame, and a prop is installed to hold the face open. A letter is installed on both sides of the frame but only one side opens.

Next steps include installation and hook-up of sockets, starters and lamps. The completed modules are then sent to the crating department where they are prepared for shipment.

A new nationwide sign program developed by Pepsi-Cola uses six variations of a basic design (see page 32), and has two types of privilege panels on which the local dealer has his name printed. These signs are of conventional construction, using aluminum for the skin and steel angle irons for internal support.

The Mark I version is 4 feet wide by 6 feet tall. All four faces of this unit open. Main design feature of the sign is its curved sides formed of gold anodized aluminum extrusions. This particular model is made up of 40 different pieces on which the metal shop must perform 157 different machine and welding procedures. Including duplication, the sign is made up of 92 pieces which require 280 operations.

The curved skin of the sign is composed of double-T extrusions which, after being cut to size and pierced, are roll formed to a 16-foot radius on a Kave & Roach machine. Then the side pieces are louvered for ventilation and all the pieces are sent out for anodizing.

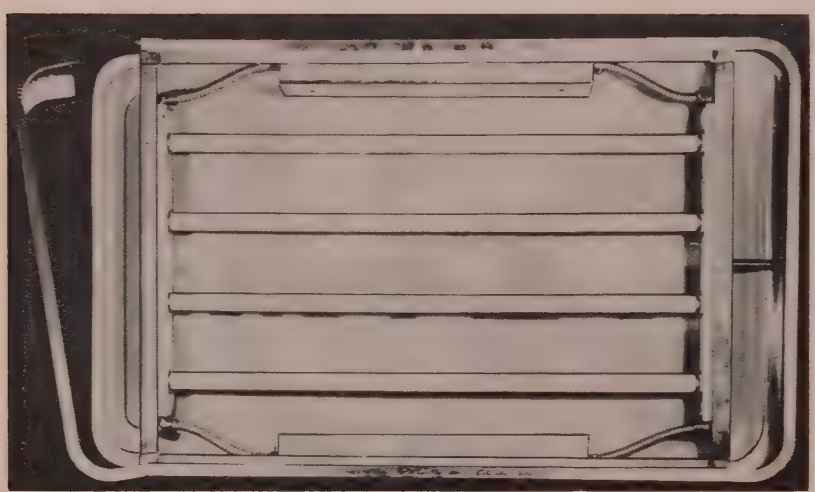
Face Trim Has 16 Pieces

Sixteen pieces of face trim are used in each sign, with each piece requiring six separate operations, plus anodizing. Two types of extrusions, a U-channel and a U-channel with a ½-inch lip, are used. In preparation these pieces are first sawed to blank, roll formed on a 160-foot radius, then sawed to size.

Top and bottom pieces are notched and drilled along the face, as are side pieces which are also tapped at each end for fastening to the top and bottom segments. When all these operations are completed, the pieces are sent out for anodizing.

Sign faces for this unit require silk screening which is a more complex operation than that needed for the Texaco modules. First, distortion screens are made so silk screening can be done before forming. These special screens are developed so the sign will have exact proportions in its formed state.

Screening is done on the inside of clear plexiglass sheets so the colored design shows through, yet is not directly exposed to rain, snow, etc. After paint-



■ *This is the interior of a conventional sign. Galvanized steel angle irons were used to form interior support and electrical raceways, skin is anodized aluminum. Side at left opens so sign face can be inserted or removed.*

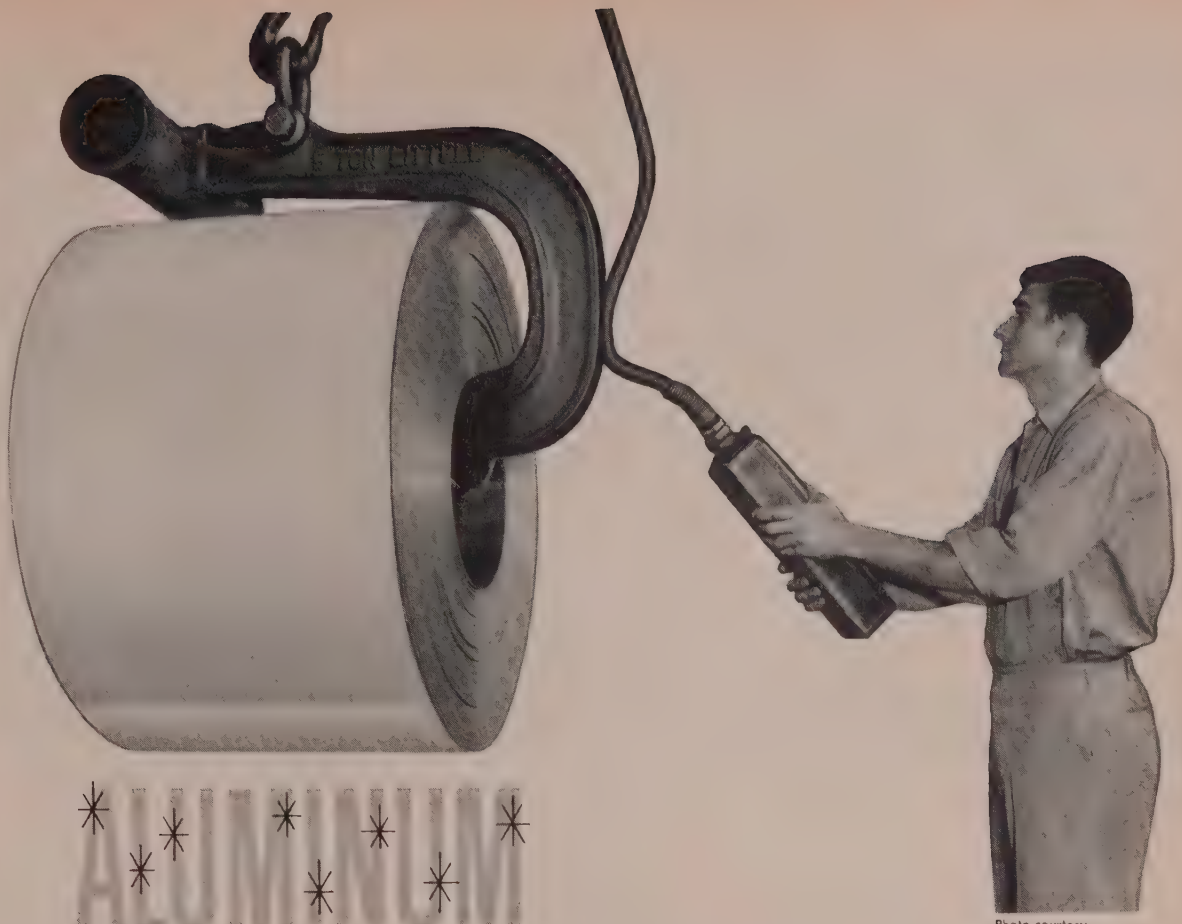


Photo courtesy
LITHO-STRIP CORP.

Bonderized and painted coil...

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Bare aluminum enters the finishing installation and is cleaned, Bonderized and roll coat painted in continuous automated operation. Re-coiled, it's ready for forming into any one of dozens of products.

This is the most efficient, effective and economical method for painting aluminum. Straight-line production is utilized, labor and material costs are reduced, quality is maintained and the performance of the finish is spectacularly increased.

Paint adhesion over the Bonderite coating is so strong that it permits the most severe forming operations without peeling or failure.

Service life of paint over Bonderized aluminum—5 to 10 times that on untreated aluminum—assures product performance and customer satisfaction.

Aluminum, Bonderized and painted in the strip, is being used in huge tonnages today. Better investigate its economy and advantages for your production. Call in the Parker representative now!

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■ *This overall view shows various stages of sign production. At top center steel frames are stacked after having been welded. Frames then go to line at left where electrical wiring is installed followed by other lighting components. At bottom, fluorescent bulbs are inserted. Wired frame then is placed in plastic-aluminum shell and sign is crated (right).*

ing, sheets are heated to a prescribed temperature in an air-circulating oven, then formed. Next, the inside of the face is sprayed with white paint, or other back up colors.

There are two advantages to forming after silk screening: It is easier to apply the design to a flat sheet than to formed material; and the subsequent heating and forming operations strengthen the bond of paint to plastic.

After anodizing, frames are assembled and sign faces inserted. Then normal assembly procedures and electrical hookup follow.

Because of their light weight, the plastic-aluminum signs can reach enormous sizes. So far, the largest single sign the company manufactures is for Tastee-Freez. It is 6 feet high and 23 feet long. Aluminum extrusions frame most of the unit, but formed sheet is used for the intricate curves of the soft cream in a cone (see page 32).

Two giant modular signs are now being constructed for Texaco and will be erected in Arizona. Both will read "Texaco Auto Truck." When all the letters are strung along the steel channels, the two-sided highway signs will be 5 feet 6 inches tall and 76 feet 9 inches long. One sign will be seen on Route 66 near Kingman, the other near Phoenix.

Signs have been produced for many years, so this industry cannot be called a new one. But this sign industry based on mass production and nationwide distribution is new, and its fantastic growth has been the direct result of combining plastics with aluminum. The industry is now a volume outlet for both materials.

But what of the future? Will the industry continue to grow and Tel-A-Sign along with it? In what areas will it expand? Will aluminum continue to be a prime sign material?

Industry Greatly Expands

After Tel-A-Sign moved into its new quarters at 3401 W. 47th St., in Chicago, Steiger had this to say: "We started the business in 1950 as a pioneer in illuminated plastic signs. This industry was virtually non-existent. Since then, it has grown into an $80 million a year business, and our move and expansion reflect this huge growth.

"It is not unexpected that the tremendous potential of this industry will compel even greater expansion on our part, possibly in the next year or so."

Steiger predicts a $100 million industry in the next few years. He points to the more than 180,000 gas stations in the country as an almost untouched market which, when properly covered, will provide a great business boost.

With all this growth predicted would future signs be all plastic? Or would aluminum's usefulness become even greater than it is now?

To the first question Herb Hellmer answers: "We couldn't economically produce an all-plastic sign that would pass city codes. Costs would be prohibitive to make such signs with strengths comparable to our current all-aluminum or aluminum and steel models."

Steiger also sees a trend toward increased use of aluminum in both indoor and outdoor signs. Aluminum extrusions and die castings will be used to produce low-cost indoor signs because of the fewer fabricating and joining operations needed when using such components. Another advantage of using aluminum for indoor signs is the beauty available from anodizing.

An example of a low-cost indoor sign is a beer company unit for use in package liquor stores and taverns. The sign has gold-anodized cast ends and a fluorescent illuminated, colored plastic face. It sells for *less than $10*.

Outdoor signs will use more aluminum because manufacturers want to simplify operations as much as possible. By incorporating structural ribs in the skin extrusion—as in the Texaco modular sign—the need for a steel interior support is eliminated.

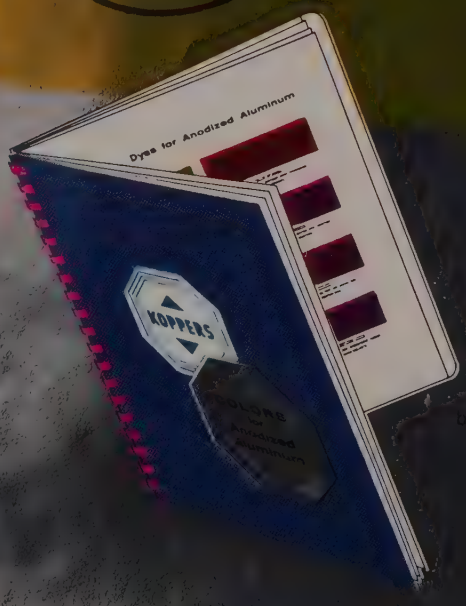
Tel-A-Sign's plans have included some preliminary investigations into all aspects of installing its own anodizing facilities. No definite decisions have been made as yet, but such plans further emphasize Steiger's confidence in his company's and his industry's future growth. It also points up the fact that Tel-A-Sign expects to use a lot of aluminum in coming years.

Your Future in Colors for Aluminum

The colored aluminum of today and tomorrow will be used more widely than ever before—both decoratively and functionally. To meet the increasing demand, Koppers has introduced a comprehensive line of new colors for anodized aluminum . . . and are constantly developing others.

These dyes have been carefully tested to assure uniform quality. Koppers Colors and the new, advanced techniques for applying them will be of interest to you.

Send today for our descriptive brochure which includes available colors with fastness ratings and a step-by-step explanation of anodizing procedures.



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KOPPERS

New Jobs for High Strength Honeycomb

Hexcel Products ferrets out new markets for all types of honeycomb core materials; introduces aluminum honeycomb 15 to 30% stronger than previously used alloys.

■ ***New development is HOBE (Honeycomb Before Expansion) snake. Capable of being used to stretch-form almost any contoured metal part, a length can be given many unusual shapes.***

USE OF aluminum honeycomb in aircraft, missiles and ground support equipment is expected to grow by at least 20% in the next three years, according to Hexcel Products, Inc., Berkeley, Calif., large producer of honeycomb core materials. Non-military applications are increasing too, the company indicated.

Hexcel makes all types of honeycomb from stainless steel to kraft paper. Its latest entry is a new aluminum material, 5056 honeycomb, which is said to be the strongest aluminum core ever produced.

The 5056 alloy contains about the same metals as previously offered aluminum honeycombs — with the exception that it has a higher magnesium content. Hexcel engineers report 5056 is 15% to 30% stronger than any aluminum honeycomb ever developed.

The new honeycomb is produced in cell diameters ranging from 1/8 to 3/8-in. and in foil gauges of .001 and .002-in. Pieces are available in sizes up to 28 by 96 inches.

Actually, the new material isn't intended to replace existing honeycombs. Instead, Hexcel believes it will make possible a large number of new applications and designs requiring a higher-strength material — particularly for aircraft and missiles. And if there's any field where new designs and applications are cropping up rapidly, it's the use of honeycomb for planes and spacecraft of all types.

For example, almost every U. S. satellite, including those now whirling about the earth, use honeycomb as a structural material. The same is true of the U. S. missile arsenal, and most U. S. military aircraft. The reason is that honeycomb provides an extremely high strength-to-weight ratio (16 times stronger than steel), can take high temperatures and vibration in its stride, and is one of the best energy absorbers known.

To illustrate how widely honeycomb is being used in today's spacecraft and missile industries, witness this partial list of applications: the Boeing 707, DC-8 and Convair 880 Jet Airliners, all five Pioneer satellites, the Mercury Space Capsule, the B-58 bomber, the X-15 "rocket" plane, and many others.

Honeycomb is used in aircraft on wing, fuselage and empennage surfaces, leading edges, trailing edges, control surfaces, ribs, bulkheads, doors, air inlet scoops, ducting, nacelles, fuel tanks, dive brakes, nose and tail cones, fire walls, exhaust blast panels, sweat cooling panels, vibration dampeners.

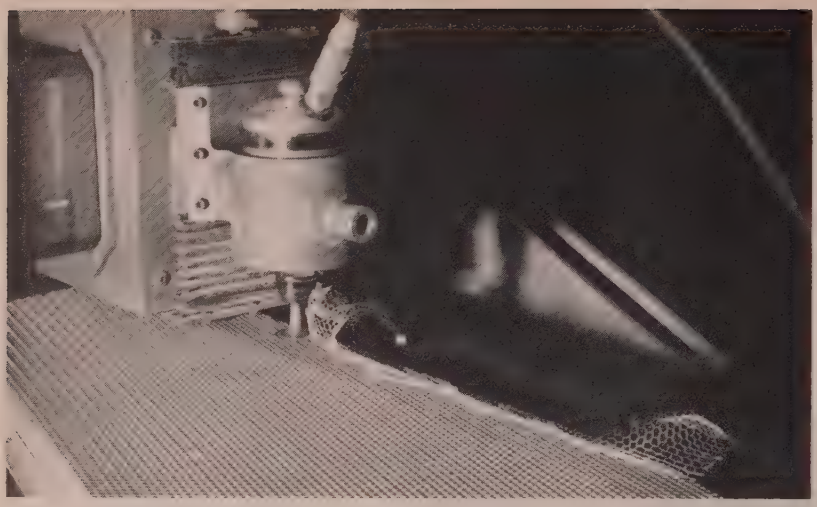
Another structural application of aluminum honeycomb is its use in stabilizer fins which have been added to the pilot ejection seat of North American Aviation's X-15 rocket plane. The fins prevent uncontrollable tumbling through the air should the pilot have to bail out, and allow safer parachute openings.

In missiles the material is used on wing surfaces, fins, nose sections, engine compartments, bulkheads.

It is in these fields — aircraft and spacecraft — that the new 5056 honey-

■ ***Reported by Hexcel to be 15 to 30% stronger than any aluminum honeycomb core ever developed, the 5056 material comes in for a severe test as stabilizer fins for the pilot ejection seat of the North American Aviation X-15 rocket plane.***

■ ***A B-58 escape hatch, shown on contouring mold, is typical of uses expected for 5056 honeycomb.***



■ *Special contour-cutting machine is shown giving special shape to Hexcel 5056 aluminum core section. The material has growing use in missiles, aircraft. Has substantial use in more prosaic fields.*

comb is expected to find its largest-volume applications.

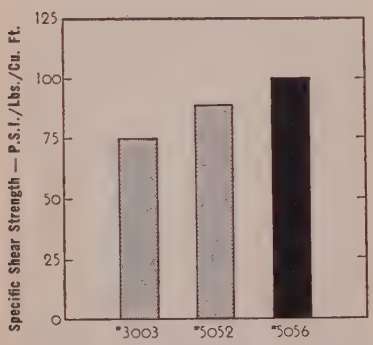
But honeycomb also has substantial markets in more prosaic applications. For example, Hexcel this year expects to sell close to $1 million worth of its aluminum light-diffusing ceiling material, Honeylite. A stepped-up marketing program for the product was launched earlier this year.

There are also large-volume buyers in the furniture and building industries. Here the interest is in honeycomb sandwich for paneling, table tops, flooring and decorative effects.

The very latest commercial application for honeycomb is the HOBE (Honeycomb Before Expansion) snake. Called a "near-perfect" filler snake for use in the stretch-forming industry, the HOBE is completely flexible and can be used to stretch form almost any contoured metal part.

It's long been known that filler snakes made of block segments do not conform well to a curved surface. For better conformity engineers have made snake segments shorter and shorter. The HOBE snake, in effect, represents the ultimate in this process.

Though the HOBE is actually a segmented snake, its segments are only 0.005-in. wide. Thousands of strips of 0.005-in. thick aluminum foil are stacked and secured to one another to form a snake of any size. Produced in this way, HOBE snakes are more economical than conventional types. Current price ranges from 30 to 80 cents per cubic inch of snake depending on the complexity of the cross section.



■ *Chart shows comparative strengths of Hexcel aluminum honeycomb starting with alloy 3003 material (left) which was the initial development. Improved material, alloy 5052, came in 1954. No. 5056 is newest core material.*

Versatile, Too

Another advantage over segmented snakes is ease of storage; HOBE snakes are easily coiled. Also, the HOBE's configuration can be changed easily by machining, making possible a multi-purpose snake.

Other new honeycomb applications, both commercial and military, are constantly being developed — as are new refinements in manufacturing methods. A typical example of an independently developed honeycomb manufacturing method is Hexcel's procedure for making 5056. A brief outline will illustrate the basic production techniques.

A 5500-ft. roll of 61-inch foil is fed into a specially designed glue line machine after being cleaned thoroughly in a series of chemical baths. After drying the foil passes through an automatic striping unit which puts adhesive at predetermined lateral intervals — on both sides of the sheet.

The adhesive striping is offset so the bonded assembly of foil sheets will expand to hexagonal cells after the adhesive cures. The adhesive dries almost immediately but gains its strength only after heat and pressure are applied in the final stages of core fabrication.

The aluminum then goes through a perforator which punches a series of .005-in. holes across the face of the foil. Purpose is to provide a vent for volatile gases to escape when the sheets are placed in the press for bonding.

The glue line machine cuts the sheets to a maximum size of 24 x 61 inches and alternates each sheet so the stripes of adhesive, or glue lines, are in the correct offset position in relation to the preceding and succeeding sheets.

The sheets are then stacked to a predetermined height proportionate to the expanded honeycomb and placed in a press at 100 psi for 1½ hours at 350°F. After cooling, the material, now called HOBE, is ready to cut.

For Special Work . . .

Some HOBE's are trimmed by a bandsaw and shipped to plants equipped to expand them. For special work, however, the HOBE's must be cut, expanded and formed in Hexcel's plant.

Lightweight core materials are expanded by putting the HOBE on a special table and spreading it out using a plate equipped with prongs which fit into the honeycomb cells near the end of each unit. The heavier HOBE's are expanded in the same manner except that special fabric loops are glued to the lateral axis and hooks placed in each loop.

Production methods vary with the type of honeycomb produced and require specialized machinery which Hexcel is constantly improving and refining. And with production methods and new applications for honeycomb being actively developed, and demand from established outlets definitely on the increase, honeycomb manufacturers see a boom period continuing well into the 1960's.

■ *Specially designed glue-line machine takes 5500-ft. roll of 61-inch foil through automatic striping unit which adds adhesive at predetermined lateral intervals— on both sides of sheet. Note stripes of adhesive on foil.*

WEATHER-RESISTANT BUTYRATE LACQUERS PRESERVE THE NATURAL BEAUTY OF ALUMINUM

Here's welcome news for aluminum fabricators.

Clear, colorless Butyrate lacquer—a new type of coating—provides lasting weather protection for aluminum.

Butyrate lacquers form tough, tenacious coatings that won't turn yellow, even under prolonged exposure to sunlight. They withstand oxidation and discoloring...have excellent flexibility and strength...and are little affected by salt spray, water immersion or temperature change.

Cleaning and maintenance costs are reduced to a minimum, too, when outdoor aluminum products are coated with Butyrate lacquers. Apart from an occasional hosing in areas of extreme contamination, rain alone will keep the aluminum surface gleaming.

This combination of features makes Butyrate lacquers particularly advantageous for use on aluminum curtain walls, siding, spandrels, louvers, solar canopies and architectural trim and hardware.

Butyrate lacquers are easy and economical to use...afford excellent protection with a single coat. They are available from lacquer manufacturers in all parts of the country.

An informative 15-minute, 16mm. sound color film has been produced especially for viewing by those who design in or specify aluminum in an outdoor application.

North Central High School, Indianapolis, controls sunlight and reduces summertime heat transmission with aluminum sun cornices made by O. O. McKinley Co., Inc., of Indianapolis, Indiana. The satin finish of the aluminum surface is protected from weathering by a clear, colorless Butyrate lacquer.

The finest lacquers for aluminum are made with

Eastman BUTYRATE

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City, Atlanta; Framingham, Massachusetts; Cincinnati; Cleveland; Chicago; Greensboro, North Carolina; St. Louis; Houston. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

ALUMINUM FABRICATORS!

Take these 4 steps to get the complete story on this new method of preserving exterior aluminum.

(1) Send for Eastman's catalog on Butyrate lacquer. It tells you where this new protective coating has proved particularly successful and why these lacquers are so effective in preserving aluminum surfaces.

(2) Check Sweet's Industrial Construction File, Sweet's Architectural File, and 15-M of the A.I.A. Alphabetical Filing System for specification details.

(3) Send for sound color film. Please indicate the date you plan to show the film and an alternate date.

(4) Write for names of manufacturers of Butyrate lacquer.

Aluminum Upgrades Design Of Seating Equipment

The light metal finds increasing favor at American Seating Co., the nation's leading manufacturer of public seating. Company's forte is classroom furniture where aluminum makes an exciting contribution to seat and desk design (left).

By H. K. Darby, Associate Editor

■ *American Seating Co.'s newest school product is the Varsity Line, designed with college classrooms, lecture halls and other study areas in mind. The cast aluminum bases weigh just over five pounds each, unfinished.*

NEXT year, the American Seating Co., Grand Rapids, Mich., will celebrate its 75th anniversary, a record number of years devoted to the manufacture of chairs, benches and related furniture.

If hewing to the seating line for three-quarters of a century may not be remarkable, an incidental development can be viewed as unique. The company has grown from a leading specialist in school seating to the outstanding manufacturer of "public seating" without yielding leadership in any one of its several markets. It has to contend with about 40 competitors in the school seating market alone, including at least one well-heeled newcomer, lured by the ferment of growth in U. S. education.

School furniture is still American Seating's forte, but they also make seating equipment for religious buildings, theatres, auditoriums, stadiums, hospitals (including folding chairs for institutions and other uses), and buses and trains. Result is that most gregarious Americans literally come in contact with American Seating products. One would have to be a hermit not to.

Contributing strongly to Seating's leadership in the school field is the only nationwide sales and distribution organization in the business. Over 350 salesmen regularly contact every school board in the U. S. Still another factor is the company's market research department, which gathers and digests more information related to seating than any other agency, including the U. S. Department of Commerce.

But perhaps the most important ingredient of the company's success in the school furniture business is seniority. No other company has been in the field as long; no other outfit has their feel of the market.

From its birth in 1886 as a school and office furniture manufacturer, American Seating (it was Grand Rapids School Furniture then) has exerted an important influence on materials and design. Once an effective user of cast iron and good old golden oak, the company has led the parade with new designs embodying some modern materials, as well.

Aluminum is not a big factor in the American seating operation, but it is growing in importance. Rate of increase, rather than actual tonnage consumed, is the noteworthy feature. The company used only about 5000 pounds in 1955; presently consumes about 100,000 pounds annually. It will use a great deal more in the future.

■ *In keeping with the times, some manufacturers in the classroom furniture business have designed equipment utilizing electronic instruments as a means of improving teaching techniques. American Seating Co.'s Electronic Learning Center enables teacher to give students individual tutoring. They are working at acoustically lined, aluminum topped stations. Drawer pulls of all teachers' desks in Seating line are aluminum extrusions.*

Extrusions, Of Course

School furniture represents a substantial percentage of the total tonnage of aluminum used because of the volume of sales. The bulk of this has been in the form of extrusions — all of rather light section — used as bindings on desks and tables.

The desk binding, a 1-inch wide, anodized ribbed extrusion with a ¼-inch flange, is cut in 72-inch lengths for classroom desks, hand-formed around the Amerex plastic-laminated desk top for locking by a 100-ton press. The molding serves as a decorative and structural detail.

(*Continued on page* 48)

BUILT FOR RUGGED SERVICE . . . HANDSOMELY STYLED

HUSSMANN CHECKOUTS

• Most of the action in a supermarket is concentrated at the checkout counter. During peak shopping periods it's fast and furious. This calls for rugged, dependable equipment, yet handsomely styled to add to the store's appearance. Hussmann Mechanical Checkouts qualify on all counts. G.E.I. produces three aluminum extrusions which add to the durability and modern attractiveness of this Hussmann equipment. These are precision-extruded, then fabricated at the point of assembly.

This is another example of a leading manufacturer solving his requirements with G.E.I.'s uniform quality and unfailing delivery. Discuss your extruded aluminum needs—one part or a million—with G.E.I. General's full range of aluminum services includes forming, punching, drilling, welding, mitering, bending, milling and finishing. Finishing includes plain, bright-dip, or color anodizing; sanding; buffing and painting.

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■ *Extruded aluminum edge moldings are hand-formed on a bending fixture, positioned around the desk top (background), then placed in the press.*

The ¼-inch flange on the molding is curled to clinch the extrusion to the desk top. Originally, the stroke of the press was too fast for this job.

"We felt that a fast hit didn't give the metal a chance to flow around the die," said Art VanRyn, chief tool engineer, "so we slowed her down. Now the aluminum responds to the curling steels better, and a tendency of the straight wall of the molding to buckle is eliminated. The die itself, with its internal and external cams, made it advantageous to slow the operation down so that cam action would not be too abrupt."

Another type of extruded molding is used on four sizes of "Classmate" tables and various teachers' desks. This extrusion also has a structural as well as a decorative function, having tabs notched into a projecting rib in the extrusion's back side which are twisted with a hand tool to lock the binding to the table top's steel frame.

The low silhouette feet of these tables and some of the desks have aluminum scuff plates to prevent wearing of an enamel finish. They are not anodized because they are kept shiny by the scuffing to which they are normally subjected.

Just Snap In

The scuff plates are produced from an extrusion which has an arrowhead projection on the back side and which is forced by hydraulic pressure between two halves of the steel table base. After the halves are forced apart to allow the arrowhead to slip into the slot, the necked-down section of the arrowhead allows the two steel parts to come together again, locking the scuff plate in place.

Because of the peculiar shape of this plate, it was at first fabricated in a series of press operations involving six or seven individual dies. It proved to be an expensive part to make, tying up four or five presses.

The situation prompted VanRyn to devise a transfer die into which the long, raw extrusions are fed. One operator feeds the extrusion into the die which nips little areas out of the arrowhead rib, clips away about two inches of this projection, cuts the extrusion to length, and then uses a transfer carriage to move the part from front to back in the die for successive forming operations. The finished piece is then blown out of the press. Thus, the scuff plate is made on one press.

A larger extrusion is used as a scuff plate on the new Study Center — a unitized seat and desk designed for elementary and secondary schools. The extrusion crowns the large diameter steel tubular connector between seat and desk at the point where the student's feet would be most active.

The steel legs of a special high school model are encased in aluminum tapered ferrules which give a finished appearance to the legs and conceal scuff marks. Ferrules have also been used on other types of chairs made for school use.

The ferrule is about four inches long. The company buys 12-foot lengths of ⅞, 1 and 1⅛-inch diameter drawn tubing and tapers it in a swedging machine. They then continue with the remainder of the tube, swedging and cutting 'til the 12-foot length is used up except for about three inches of scrap. The part is deburred, then installed on the leg with an air press.

Die Casting Does Better

Still another unit has a good sized aluminum die casting in the swivel mechanism of the seat. The deep ribbed component measures about 2¾ by 2½ by 1⅜ inches and supplants gray iron which had less dimensional accuracy and was vulnerable to shock fatigue. The aluminum version is much stronger.

American Seating Co. reports that the school furniture market is leveling off "at the highest plateau in U. S. history" even though the nation's classroom shortage is still far from being corrected. According to J. M. VerMeulen, president of the company, the size of the market in any given year is governed by the amount of new completed construction plus the replacement market.

"We believe there will be a slight drop in classroom furniture requirements this year for a number of reasons," he adds. "School building starts are off from last year and bond sales to finance school buildings have dropped substantially. Both of these indicators seem to

■ *Large press is used to attach extrusion to desk top. Machine was "slowed down" somewhat to work the aluminum more efficiently.*

be ready for an upturn, but only part of the upturn can be expected in 1960."

VerMeulen told the 1960 convention of the American Association of School Administrators that "there may be a drop of several percentage points in school building this year, but we expect to get a bigger slice of a smaller market. There's no question of increased growth at the college and high school level, and I expect college enrollment will double or triple in the next 10 years."

In preparing for whatever new building or replacement market this extra college enrollment may generate in the future, American Seating has introduced its new "Varsity" line (illustrated). The matching pedestal chairs and tables of this line are expected to find use in lecture rooms, amphitheatres, dormitories and other school areas.

They are designed to provide a continuous work surface in straight or curved rows, or in individual sections as two-student tables. Each table section is 48 to 60 inches long, 16 to 24 inches wide and 29 inches high. For curved rows, sections would be fitted to the arc required.

An outstanding design feature of the "Varsity" line are the circular permanent mold cast aluminum bases for seats and tables. They are 11¾ inches in diameter, about ⅝-inch high, with a machined bevel. To give the base a contrasting, high-lighted effect, the pieces are shot blasted before beveling.

The aluminum base is a decided improvement over the cast iron base used on an older line, according to B. W. Henrikson, director of research and development. "The aluminum base retains its good looks with a minimum of maintenance and hides its steel floor

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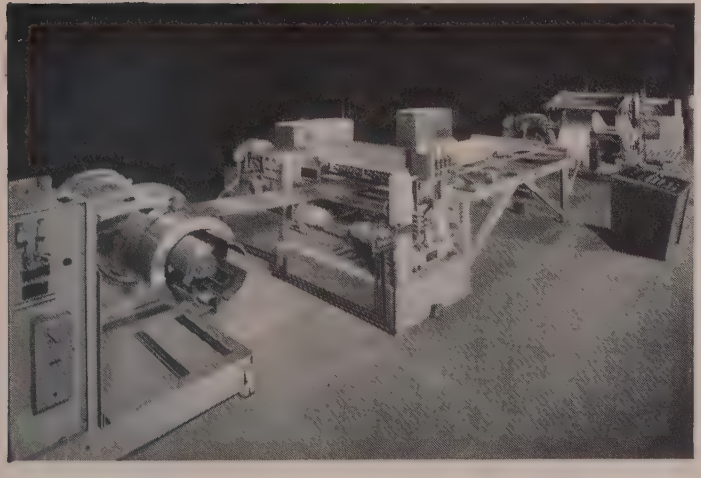

Overall view of new Voss "coil leveling line" for production of siding quality aluminum up to 48" wide. Modern equipment such as this means better quality aluminum from Sheet Aluminum Corporation.

It's hard to beat the combination of personalized attention from a small, experienced company that possesses some of the biggest and best equipment in the industry. You get top quality aluminum and you'll always be certain that your specifications will be met.

Sheet Aluminum Corporation operates a modern 4-Hi rolling mill . . . a new 48" Voss Leveler and matching units to custom roll aluminum to any thickness from .006" to .102" in coil or sheet . . . widths from 3/8" to 48". A wide range of alloys include 1100, 3003, 5005, 5050, 5052, 5357 and 5457.

On your next order for coil or strip aluminum, get personalized service . . . faster service . . . better service . . . from one of America's most experienced and best equipped custom rollers . . . SHEET ALUMINUM CORPORATION.

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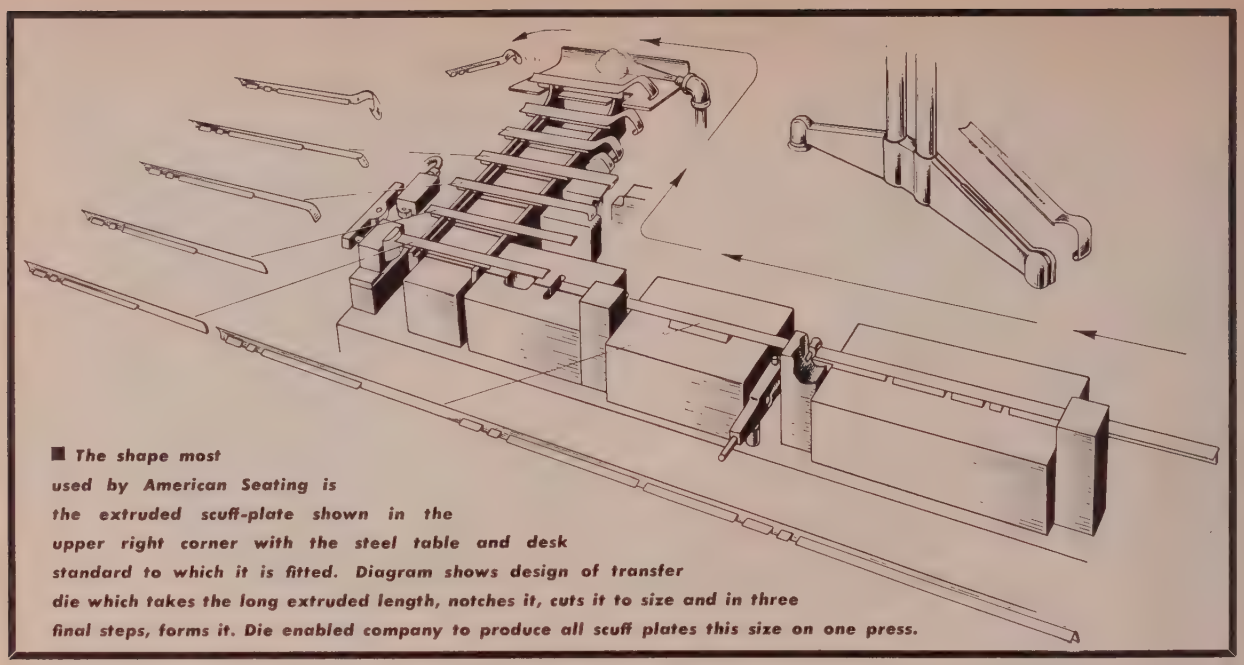


■ *The shape most used by American Seating is the extruded scuff-plate shown in the upper right corner with the steel table and desk standard to which it is fitted. Diagram shows design of transfer die which takes the long extruded length, notches it, cuts it to size and in three final steps, forms it. Die enabled company to produce all scuff plates this size on one press.*

attachment fixture," he said.

The discs are twisted onto the steel retaining plate and the flanges on the underside of the aluminum circle are being replaced with cast-in lugs which will give a more positive lock. The tables, made mainly of plastic and plywood, have a thin extruded aluminum edge binding on the apron.

Henrikson sees increasing use of aluminum ahead for American Seating, even though other materials sometimes seem to have the advantage.

"There is no question that aluminum greatly enhances product appearance," Henrikson said. "It's still a glamor metal. We want to use it wherever we can, consistent with cost and strength factors. Aluminum has been undergoing tests for other applications in our products. There will be a substantial increase in its use here."

Electronics for Teaching

One indication of American Seating's leadership in the school field is the speed with which it adapted electronic instruments to teaching. The company's Electronic Learning Center (see picture) has already been tested under actual classroom conditions and has proved its great value in the study of languages. It does not take the place of traditional classroom techniques, but speeds and improves learning.

Individual student stations of The Learning Center are partitioned with acoustical panels which are topped with the heaviest aluminum extrusions designed into American Seating's classroom furniture.

The religious market is next in importance to American Seating, but the use of aluminum is minimal here. What does look better for the light metal is the amusement market, which is expected to offer a lot of business activity during the next few years.

Ball park seating is generally standard, but theatre and auditorium seating is largely a custom market. Result is that aluminum's presence in the specifications will depend on the builder's conception of need.

One exception to this practice occurred right after World War II when American Seating, with a backlog of 800,000 theatre seats on its order books, found itself with a substantial quantity of aluminum scrap left over from its Army bomber sub-contracting days. The metal was remelted and cast into seat standards. Chances are, this was the first and last chance for aluminum in this kind of application, except for the salesmen's samples of gray iron standards which are cast in aluminum for easier handling.

Aluminum isn't likely to rob cast iron of any theatre standard jobs because of price and the fact that light weight isn't enough to have any favorable effect on building or balcony construction specs. Nor is there a corrosion problem in indoor seating.

On the other hand, one would think

■ *Candlestick Park, new home of the San Francisco Giants, has 5000 pounds of aluminum fasteners in its seating because of their rust resisting quality. Cast iron seat standards will have to be painted once every two to four years, depending on whether or not they are sheltered. At 60 cents or more a seat, painting cost runs into the thousands of dollars.*

Whether furnace output is measured in grams or tons, Hevi-Duty's value solution pays steady operating dividends.

When you consult a Hevi-Duty Sales Engineer on any heat-processing problem, you take three important steps toward a sound solution. For Hevi-Duty helps you three ways:

Designs the system to fit your need. A Hevi-Duty Applications Engineer works full time on such problems. Call on him. He might save you countless hours. He may have solved a problem like yours last week.

Designs the furnace to fit the system. Usually, the unit you need will be a proven item, for you are drawing from the most complete line of heat-processing equipment in the business. If not, Hevi-Duty engineers can quickly design the unit that fits your needs exactly.

Builds the furnace to last. Hevi-Duty furnaces are built for tough, continuous production work. They are designed to last, and hundreds of case histories prove they do.

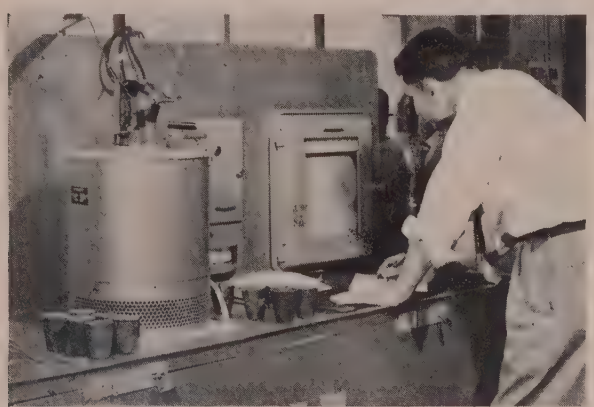
Here are three typical examples of non-ferrous melting furnaces spanning a wide range of sizes, yet each provides the value solution to a problem.

HEVI-DUTY

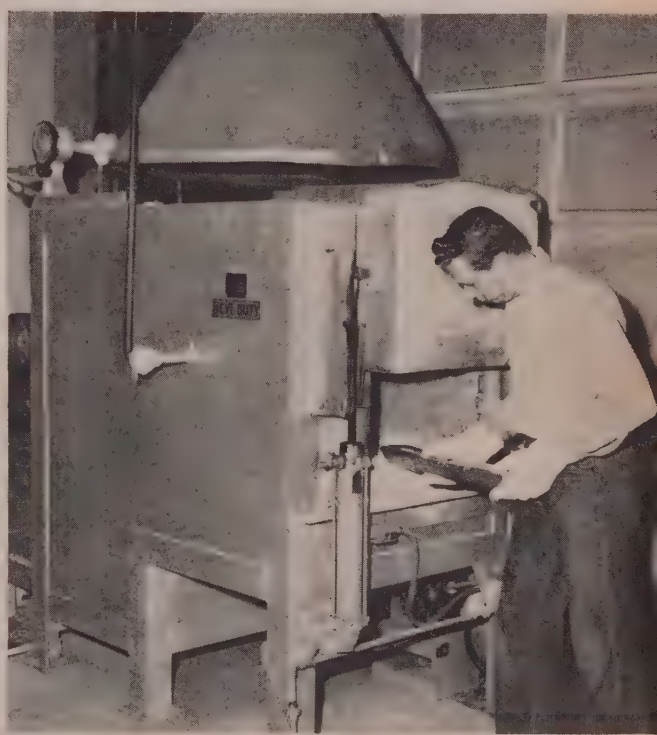
Electric and Fuel-Fired Industrial Furnaces and Ovens

B P C — A Division of Basic Products Corporation

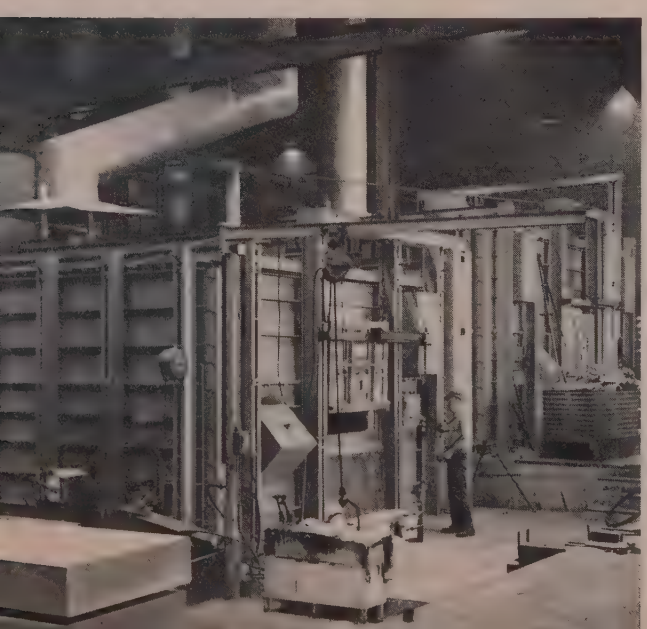
Hevi-Duty Electric Company, Milwaukee 1, Wis.



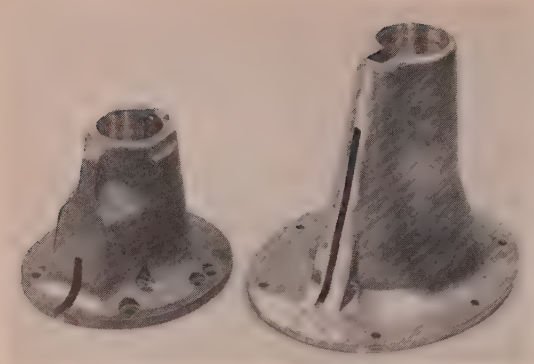
Wall Colmonoy Corp., Detroit, Michigan, uses this Hevi-Duty laboratory crucible furnace to find exact melting temperatures of hard-surfacing and brazing alloys. Furnace heats rapidly to the 2200° F. temperature required, provides precise control for melting and cooling tests on 250 g samples. User reports long element life at high temperatures. ***For more information, send for Bulletin 1246.***



This Hevi-Duty double-chamber, dry-hearth furnace melts 100 lb of aluminum per hour, 16 hours a day, 7 days a week at Alliance Mfg. Co., Alliance, Ohio. It can provide up to 200-lb-per-hour output and occupies little space. It maintains critical bath temperatures during charging. User states: "You can turn it on and forget about it." ***For complete information, send for Bulletin 593.***



Kawneer Company, St. Charles, Illinois, has installed a second pair of Hevi-Duty reverberatory furnaces for breakdown and holding in direct-chill ingot casting of four different alloys. Furnaces provide ± 10° F. control, pour at 1320° F., operate 24 hours a day. Capacity is 100,000 lb a day. Note in the foreground two of the 6,300-lb aluminum ingots produced. ***Please write for Bulletin 591.***



■ *Bus driver seat pedestals were American Seating Co.'s first big application of aluminum—around 1946. Still cast in aluminum, and now are also being used in diesel locomotives, trucks.*

that operators of outdoor arenas would prefer aluminum because of its resistance to corrosion. The iron seat standards at Chicago's Comiskey Park are painted every other year at a cost of thousands of dollars, but the major league ball clubs don't seem to mind spending this kind of money.

Aluminum's use in outdoor amusement seating is presently limited to nuts, bolts and wood slat separators. Candlestick Park, new home of the San Francisco Giants, has 5000 pounds of these aluminum fasteners in its seating.

It's a Posh Arena

Perhaps the best known indoor seating job carrying a substantial amount of aluminum is the new Los Angeles Sports Arena where, this summer, the Democratic Party will nominate its candidate for President. Except for rear seats that are practically flush against a wall, the backs of approximately 12,000 fixed seats have an anodized, embossed aluminum rear covering. The front surface is upholstered.

For this job American Seating bought 11,500 pounds of .020-inch thick coiled embossed aluminum sheets, 21½ inches wide, and had them anodized.

According to Wayne Hutchins, an American Seating engineer who devised the assembly system, the 5-ply plywood cores were bent to shape (18-inch radius) in a steam press. Blanks approximating the size of these panels were cut from the aluminum.

In assembly, an operator sprayed contact cement onto a wood back panel, then onto an aluminum panel, and then racked both pieces to dry in air.

"We gave the cement an air drying period of 25 minutes during which it became tack-free," Hutchins explained. "The more solvent you get rid of in drying, the stronger the bond."

At the end of the 25-minute cycle the operator selected the dryest pair, put them together in a jig and ran them between pinch rolls, getting an intimate contact between the two parts. After this, the bond was strong enough to allow another operator to trim the aluminum to the shape of the wood panel, using a small band saw.

A flexible adhesive is necessary for bonding dissimilar materials having different rates of expansion. Anodizing produced a sufficiently clean surface to make further treatment unnecessary.

After assembly of the aluminum to the plywood panels, an operator punched holes through the aluminum panel and into pre-drilled wood panel holes for fastenings for an upholstered front.

The next operation was the application of an extruded anodized aluminum molding around the top and two sides of the aluminum-wood combination. This was done partly by pre-forming the molding, fitting it around the panel by hand, and then putting it in a hydraulic press. A total of 60,500 lineal feet of this molding was used. The embossed aluminum sheet for the job amounted to about 38,000 square feet.

According to Keith Dickinson, manager of the auditorium and stadium seating, the Los Angeles people specified aluminum because they wanted seat backs that would not have to be painted. They had noted that the risers were 18 inches high, which would have exposed the backs to scuffing.

"The anodized finish will get scratched," Dickinson conceded, "but the scratches will not be nearly as noticeable as rubbed off enamel would be."

■ *The Los Angeles Sports Arena, scene of the Democratic National Convention in July, has 12,000 seats which American Seating Co. backed with embossed, anodized aluminum.*

There was a question as to the metal used for the seat pans, the slightly concave metal coverings for the under part of the seat. Aluminum isn't used here, but a suitable thickness would doubtless ensure their serviceability. The Los Angeles people specified chrome plated steel seat pans.

Research director Henrikson said that bus drivers' seat pedestals were American Seating Co.'s first application of aluminum. That occurred directly after the end of World War II. The pedestals, still made, are the company's only use of the light metal in transportation.

The pedestals are made by permanent mold casting. In one size the bottom oval measures 11⅞ by 9¼ inches, with the height of the base about 8¾ inches. The 2½-inch diameter hole in the center of the pedestal has a keyway slot to take the elevation mechanism.

This hole is machined after casting and the slot is broached. Other holes are drilled in the piece for fastening the seat to the floor, and for the elevating mechanism.

Wall thickness of the base casting varies from 3/16-inch at the lower portion to much heavier sections (about ½-inch) in some critical areas.

"These castings are made in quantities of several thousand annually," Henrikson said, "and are used not only for trucks and buses, but just recently have been adopted for diesel locomotives."

Lotta Seats

Last year American Seating produced enough seats to accommodate the combined population of Cleveland, Akron, Toledo and Columbus—with some to spare. Better than 50% of this production was school seating and so had to be shipped during summer vacation.

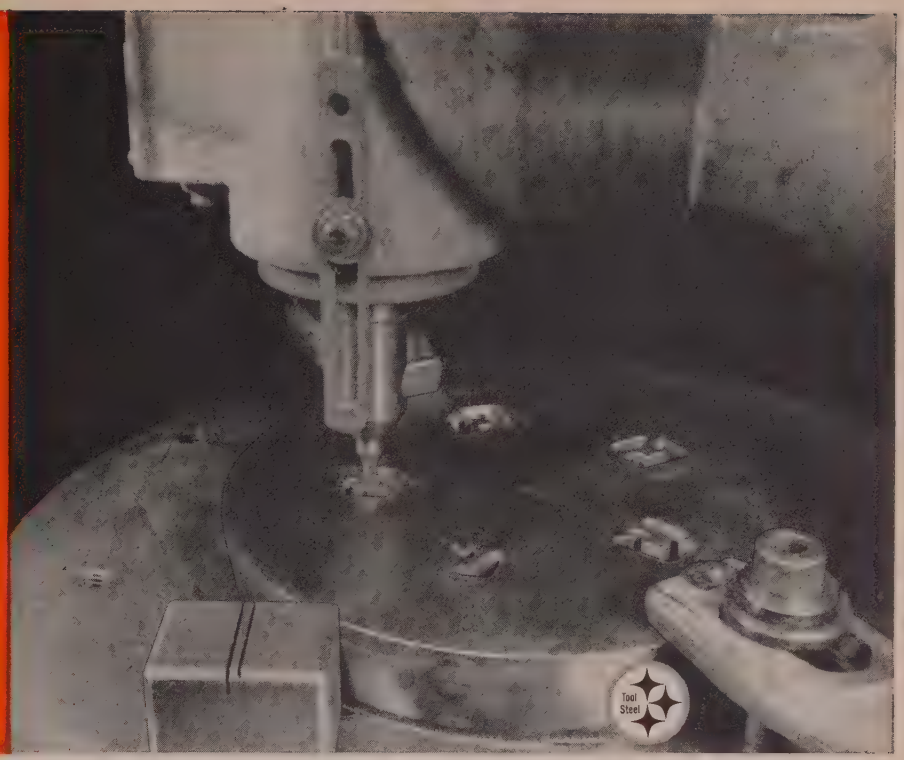
"Last year, during the 10 weeks prior to school opening, we shipped over 1100 box car loads of furniture," a company spokesman said. "That averaged more than 100 carloads a week with not one complaint about delivery or the condition of the products."

This means that warehouse space is almost as important as factory space to American Seating. Today, the company has over 850,000 square feet of warehouse space and over 900,000 square feet of factory area.

Its products are sold through seven factory branches, seven direct offices, 35 school supply and equipment distributors, National Theatre Supply Co. offices and American Hospital Supply Co. outlets, all of which add up to close to 600 salesmen serving American Seating's markets.

You *would* have to be a hermit to miss contact with that American Seating seat.

Latrobe's EXTRUSION TOOL STEELS



Dependable... easy to machine... readily available in the size you need!

When your extrusion schedule calls for fast delivery of a die steel to do the job, you can cut production time by calling your nearby, fully-stocked Latrobe steel service center for prompt attention. Whether for regular run production or specialized application, there's a Latrobe grade and size practically at your fingertips.

Latrobe's Extrusion Tool Steels are always dependable . . . easy to saw, file and machine . . . Reflectoscope inspected to guarantee internal soundness . . . made to give you the kind of extrusion production service you want!

Wide range of stock sizes available in these grades:

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VISCOUNT 20 • free-machining Type H-13 die steel
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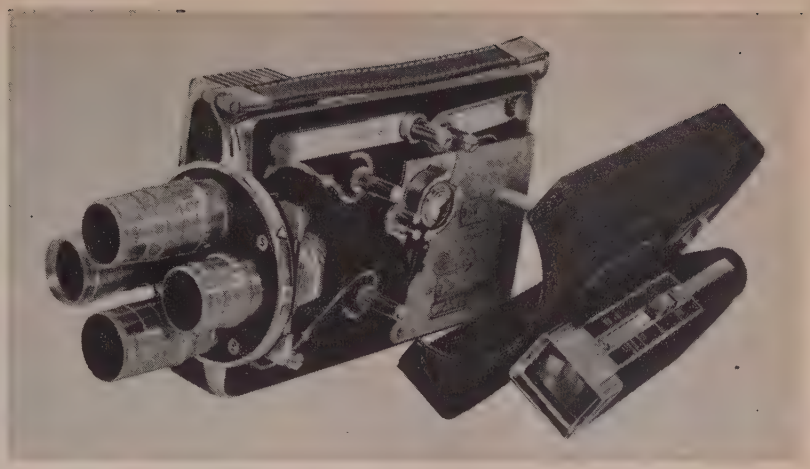
DOW | *Now in magnesium and aluminum*

MAGNESIUM DIE CASTINGS MAKE NEW MOVIE CAMERA 31% LIGHTER, EASIER TO HANDLE

Using magnesium alloy in this Wittnauer "Cine-Twin" —that converts from camera to projector in 30 seconds—cut original design weight by almost one-third!

The case of the world's first movie camera-projector—the "Cine-Twin"—is made up of five magnesium precision die castings, produced to very close tolerances in Dow's Bay City, Michigan, die casting plant. By turning to magnesium castings for the case, Wittnauer gained not only substantial weight savings, but strength

Magnesium alloy die castings provide not only lightness for easy handling, but extreme strength and rigidity to withstand even the severe test shown above.



The Wittnauer "Cine-Twin" uses a total of five Dow magnesium precision die castings to form the cover. Total weight of the castings: 0.587 lb.

and rigidity to safeguard the precision mechanism inside.

In designing this new camera-projector, 4 pounds was selected as the ideal weight to aim for—light enough to handle, heavy enough to steady it in use. By substituting magnesium for the metal originally considered, the design weight was reduced by nearly 29 ounces per unit, a weight saving of 31%. As produced, the camera weighs *just 4 pounds.*

NEW DIE CASTING PLANT, ADVANCED METHODS . . .

New plant, advanced methods, latest equipment . . . here's a thumb-nail sketch of Dow's Bay City, Michigan, die casting plant for both aluminum and magnesium, which produces these castings for the Wittnauer division of Longines-Wittnauer. Here you'll find efficient plant layout, highly trained, experienced personnel, and modern quality control equipment that means economy through increased production. A complete range of equipment sizes and types is at hand, too. For example, a Dow developed device automatically meters magnesium to casting machines, substantially boosting production rates. One of the country's largest casting machines is at work here. And backing up this plant is 30 years of Dow experience in production die casting.

MORE DIE CAST PARTS PER POUND . . .

Magnesium gives you multiple production advantages. First, you get more die cast parts per pound of magnesium than from any other metal . . . as much as 50% more parts than aluminum, 4 times as many parts as from zinc. For example, from 6 pounds of magnesium you can die cast 6 parts, whereas from 6 pounds of aluminum you get only 4 parts, and from zinc only a part and a half!

Magnesium gives you another advantage . . . production rates 50% higher than aluminum in some instances. This is due to the lower heat content of magnesium which results in more rapid solidification in the die.

Other production cost factors come down, too. Magnesium machines faster and easier, reducing tool wear while it increases output substantially

* * *

We've prepared a new die casting brochure which shows why our new die casting plant is your best source for light metal die castings. For a copy, contact the nearest Dow sales office, or write THE DOW METAL PRODUCTS COMPANY, Midland, Michigan, Merchandising Department 1052CQ5.

FROM 6 POUNDS OF METAL:

magnesium produces 6 die castings

aluminum, 4

zinc, 1½

See "The Dow Hour of Great Mysteries" on NBC-TV

DOW **THE DOW METAL PRODUCTS COMPANY**
Division of The Dow Chemical Company

Clamping device is like new after hundreds of electronic components are joined at 1100°F, as

Super Alloy Spring Wire Holds Aluminum Parts For Brazing

A NEW super alloy spring wire is "good as new" after being used in hundreds of operations as a clamping device for brazing aluminum parts at 1100°F, according to the N.R.K. Mfg. and Engineering Co., Chicago, a leading manufacturer of microwave assemblies and radar components.

Engineers of the company report that production of precision electronic parts is simpler, faster and more exact when brazing clamps are made of NS-25 wire produced by National-Standard Co., Niles, Mich.

Though other spring materials were available to the company for 1100°F aluminum brazing, the technique was costlier because the springs deformed quickly. Stainless steel springs had to be reshaped after each use, and had to be replaced after 60 or 70 brazing operations to be sure that brazed parts would meet specifications.

The NS-25 springs are never reshaped after use and have gone through hundreds of operations at 1100°F without any visible change in properties, N. R. K. Mfg. reports.

The mechanical stability of NS-25 spring wire insures proper expansion of the parts during heating. If spring tension is too great, the brazed parts will deform under the spring load. If the tension is too small, the mating parts will not make good contact and an imperfect bond will result. Typical tolerance required on complex microwave assemblies after brazing are ± 0.002 inch.

How Springs Are Used

The parts to be brazed are assembled and held in place by NS-25 springs. Typically, one end of the spring bears directly against a small plate that squeezes down on the parts. The other end is brought through the center of the helix and out through the other end. This end of the spring is secured by slipping a notched plate over a bulbous knob on the end (see photo).

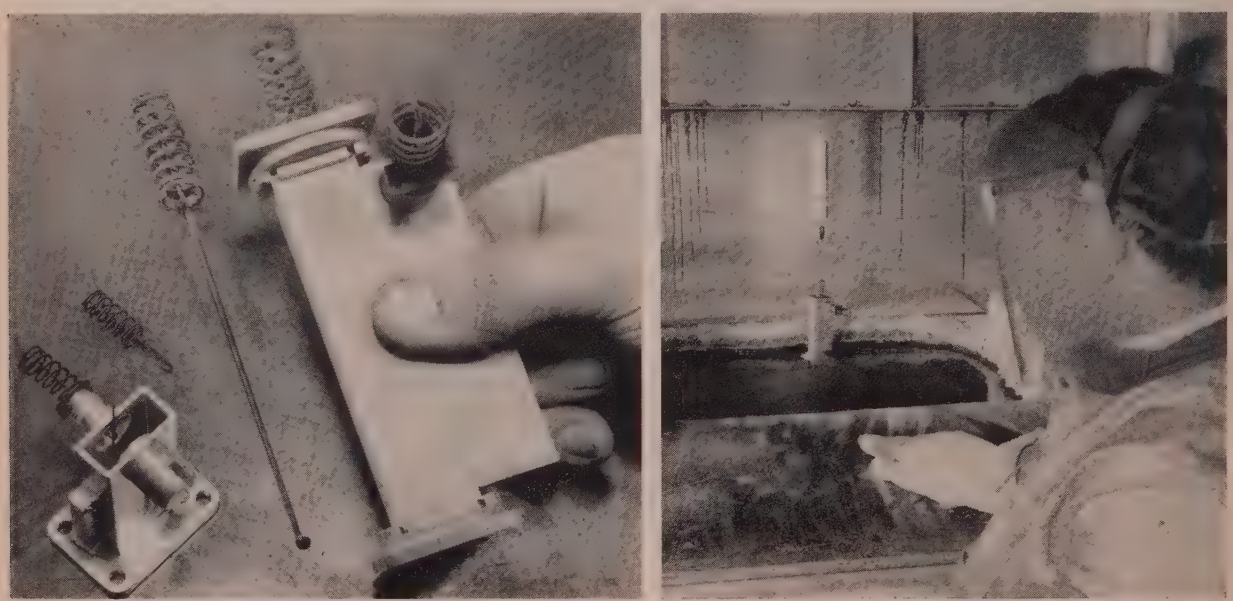
During assembly, a shim of brazing material may be placed between the parts, or a liquid brazing compound may be applied at the junction. The assemblies are then hung on hangers or set in perforated tote baskets, preheated at 1000°F for 15 to 30 minutes, then immersed in a salt bath for a few minutes to be brazed.

Depending on the nature of the parts, they may be rapidly quenched or slowly cooled upon leaving the brazing bath. The parts are then washed in warm water to remove the corrosive flux picked up in the brazing bath.

The spring clamps are removed after washing and returned to the assembly bench for reuse without re-coiling or other processing.

The cost savings due to use of the NS-25 springs vary considerably depending on the length of run for a given part and the complexity of the assembly. But N. R. K. has standardized on NS-25 springs for all jobs where spring fixturing is used, from the longest production runs to pilot runs or special orders for one unit. Savings and improved precision are realized on all runs, the company reports.

A variety of spring sizes and shapes have been designed by N. R. K. from which the proper springs are selected for each of the many hundreds of different brazing problems with which they are confronted.



■ *NS-25 springs are being used as clamping devices for brazing aluminum parts. Spring in center of picture at left shows bulbous end which protrudes at bottom of part and is secured with a notched plate, as shown at bottom of part being held. At right, assembly is about to be immersed in salt bath after being pre-heated at 1000°F.*

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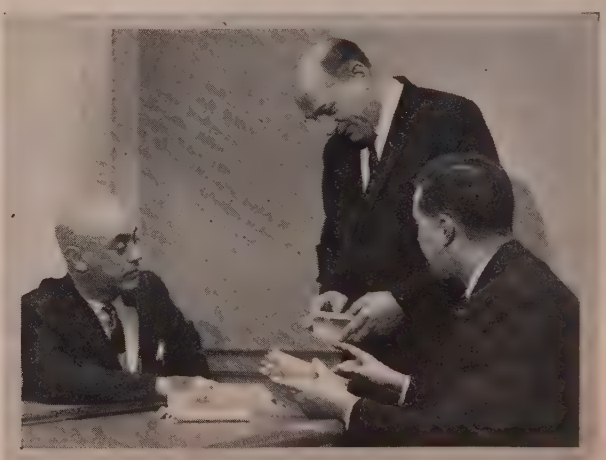
Advanced flash welding techniques give General Bronze products greater weld strength and water-tightness.

An Alwintite picture window frames Alodine 1200S spray-booth equipment at General Bronze Corporation's Alwintite Division, as conveyor-hung windows are Alodized.

Finished windows are loaded into freight car for shipment to National Homes from plant railroad siding. General Bronze supplies all painted aluminum windows for the home manufacturer's "Viking" line.



General Bronze executives examine samples of Alodized aluminum extrusion sections. Left to right: Works Manager, G. M. Keulemans; General Superintendent, George Pruessner; and Purchasing Agent, Harold Heitzmann.

Painted Aluminum Windows for National Homes!

Architects, developers and home manufacturers are calling development of painted aluminum windows "the major improvement that's been made since the inception of that type of window." Indications that a baked-on, properly applied acrylic lacquer will provide 12 to 15 years life on aluminum windows have opened new horizons for the product.

When General Bronze decided to create this new "first"—a baked enamel finish on aluminum windows—for the world's largest home manufacturer, National Homes, it called on Amchem to come up with the proper treatment and coating prior to painting and baking. The answer—a fully conveyorized and automated Alodine 1200S pre-paint spray system. The results—since Alodine was first introduced—a superior, durable finish that prevents paint failure, a reject record of zero and not a single customer complaint!

A team effort between Purchasing, Production and Management triggered General Bronze's decision to specify Alodine for their vital production roles in supplying all painted aluminum windows for National Homes 1960 line. General Bronze had created an industry standard for excellence when it pioneered the use of Amchem's Aluminum Etchant to produce a special luster-dip effect where aluminum finishes are specified in its line. The constant uniformity and ease of control obtained with this process influenced General Bronze's decision to use the extra safe-guarding qualities of Alodine in creating this major new home building development. National Homes' widespread use of Alodine on all aluminum house exteriors in their "Viking" line was also a major factor.

Amchem's special technical advisory service was put into action to help expedite the installation of General Bronze's highly efficient pre-paint finishing system. Amchem engineers collaborated with the equipment builder to provide a virtually custom-designed system. Development Laboratory testing and pilot plant processing continue at Amchem headquarters in the search for even more efficient chemicals for a higher quality end product. On personal service, one General Bronze official says: "It's not uncommon for us to run into a problem, call their representative at 8 o'clock in the morning and have them down here at 9."

With a capacity of 6,000 windows per day at their North Dighton, Mass. plant (dedicated solely to production of residential windows and sliding doors), General Bronze plans to use its Alodizing operation 24-hours a day to provide trouble-free operation during peak periods. General Bronze is confident that the Amchem products it uses will enable this company to maintain consistently uniform results in line with its highest standards of design and workmanship on all types of finishes on all General Bronze products.

Customer acceptance of a painted aluminum window that will blend with home decor and comes as a finished product (does not require painting in the field) lends further scope to this upcoming market. With exciting potentialities in store for painted aluminum windows, General Bronze now considers the possibility of extending Alodine usage to other products — painted aluminum storm windows and sliding doors.

Do you have—a product? a problem? a use for Alodine? Call or write for further details!

Alodized and painted aluminum windows by General Bronze are featured in 1960 National Homes line. Other aluminum portions of National Home models are Alodine-treated for beauty, protection and long life.

Send for Booklet 1424A describing uses of Alodine, the standard pre-paint and protective treatment for aluminum.

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Extrusions, Castings in Big Aluminum Fan Blades

Philippine oil refinery will be the first air-cooled plant of its type in Far East. Cooling will be done by 112 fans made of aluminum castings and welded extrusions. Aluminum construction preserves aerodynamic efficiency in large blades by permitting better thickness ratios.

A NEW oil refinery under construction in the Philippines will be the first air-cooled plant of its type in the Far East. And doing the cooling will be 112 aluminum fans ranging in diameter from seven to 12 feet.

The plant is being built by Standard-Vacuum Oil Co., White Plains, N. Y. The fans were made by the Metal Products Division of Koppers Co., Baltimore, to fill a contract totaling approximately $75,000.

Koppers said aluminum was chosen for blade material because of its light weight, ability to be easily formed and cast, resistance to fatigue and corrosion, and because it is economical to fabricate.

"By using aluminum we are able to preserve the aerodynamic efficiency of the fan airfoil cross-section," a Koppers spokesman points out. "In fact, the blade efficiency has been improved in some blade areas because better thickness ratios are possible."

Two different manufacturing procedures are used to produce Aeromaster fan blades, depending on the diameter of fan to be made. Blades for fans ranging from 4½ to 8 feet in diameter are cast, while those for the big fans (9 to 22 feet) are welded aluminum extrusions. This is the first use of extrusions for propeller-type axial-flow fans, according to Koppers.

The smaller blades are heat treated castings of aluminum alloy 356-T6, containing 0.3% magnesium and 7.0% silicon. Typical values are: Tensile strength, 33,000 psi; yield, 24,000 psi; elongation of 3.5%; endurance limit, 8500 psi.

Koppers selected this alloy because "the aluminum-silicon alloys are noted for their excellent casting characteristics, and their good resistance to atmospheric weathering. The addition of small amounts of magnesium makes these alloys respond to heat treatment and artificial aging, which adds considerable strength."

There are two chord widths for small diameter fans. The 6-inch chord is for fans with 54 to 72-inch diameters, while the 8-inch chord width is for fans 81 to 96 inches in diameter.

It is the fabrication of the large diameter fan blades — by welding aluminum extrusions — that is unique in the industrial fan market. These blades consist of four parts — retention shank, camber section, thrust face plate, and tip plate — which are joined by the consumable electrode (MIG) welding process with continuous welds using aluminum alloy 5154 wire. Argon gas shields the weld to prevent oxidation.

MIG Welding Best

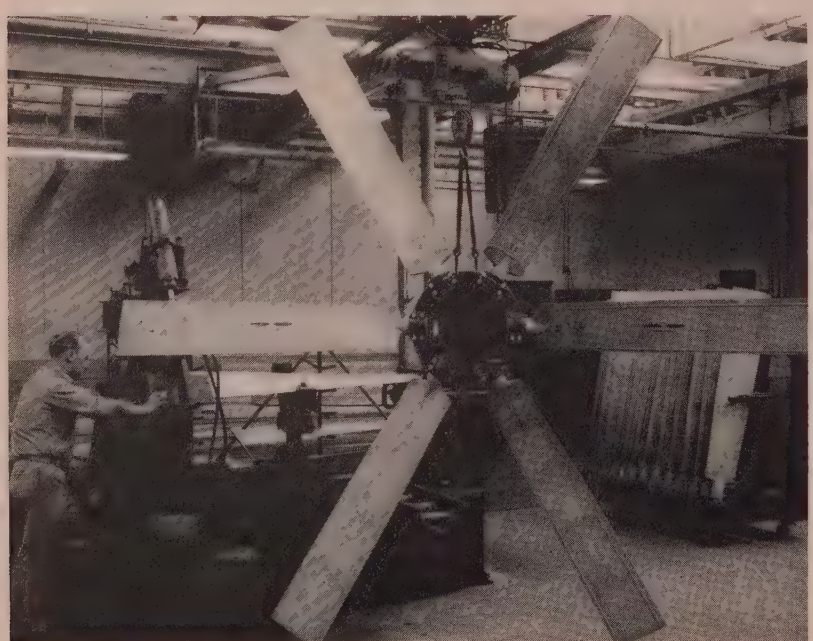
Koppers considers MIG welding best for joining aluminum because it eliminates corrosion from flux entrapment, and its speed reduces heat effect on metal adjacent to the weld. Another advantage: Magnesium content of the wire replaces the magnesium lost in the alloy by welding.

In the large-blade range three chord widths are used. For fans from 9 to 10 feet in diameter, chord width is 10 inches; fans ranging from 11 to 14 feet have blades with a 12-inch chord width; and fans from 16 to 22 feet have blades with a 16-inch chord.

The retention shank of the large diameter fans is a permanent-mold casting of aluminum alloy A356-T71. (The "A" designates an improved alloy developed for permanent molding of standard 356.) The alloy has the same composition of 356 (7.0% silicon, 0.3% magnesium) and the following physical properties: Tensile strength, 32,000 psi; yield strength, 24,000 psi; elongation, 10%; endurance limit, 11,000 psi.

Koppers' engineers contemplated using sand castings for the retention shanks but decided upon permanent mold castings because they offer higher mechanical properties. These result from a better metallurgical structure caused by rapid cooling, which produces a finer

(Continued on page 62)



■ ***Operator is twisting fan blade to shape on machine in background. Large fan shown hanging from crane is made of welded aluminum extrusions.***

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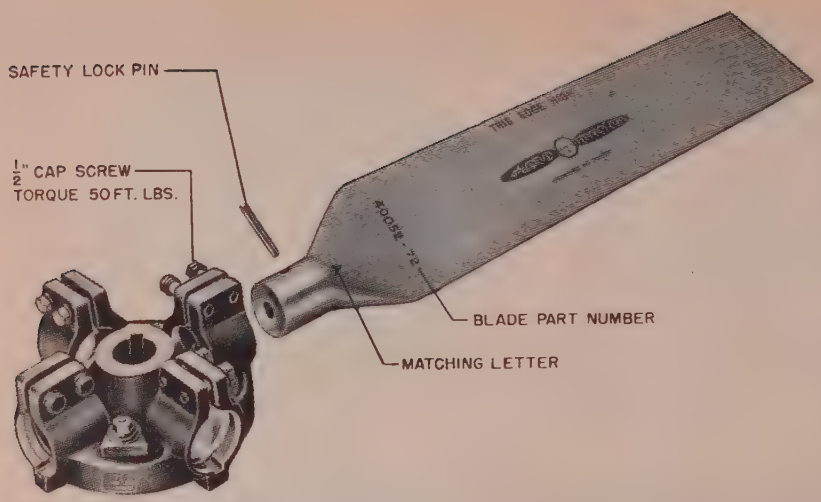


■ ***Components of small fans are illustrated. The cast aluminum blades are set in the hub and secured with a safety pin, but can be adjusted without disassembling.***

grain size and improves soundness. And engineers claim permanent molding can be held more closely to specified dimensions, while yielding a superior surface finish.

Camber sections are extruded from alloy 6063. Heat treated to the T6 condition, physical properties are: Tensile strength, 35,000 psi; yield strength, 31,000 psi; elongation, 12%; endurance limit, 9500 psi.

Extruding makes it possible to produce complex shapes in which the metal may be disposed efficiently with relation to stresses, a Koppers engineer explains. "In our blade section we provide three internal ribs that run lengthwise to the blade. These provide not only structural stiffness but also a support for the thrust face plate which is welded to the bottom of the camber section."

6063 Offers Advantages

Alloy 6063 has a high inherent resistance to weathering, plus important characteristics such as strength, extrudability and formability.

Minimum thickness of the extruded camber section is 3/16-inch with solid sections 1¼-inches thick at the leading edge and 1⅞-inches thick at the trailing edge.

The thrust face plate is also extruded from aluminum alloy 6063. For blades having chord widths of 10 and 12 inches the plate is ⅛-inch thick; for the 16-inch chord the plate is 3/16-inch thick.

Tip plates are stamped from ⅛-inch alloy 6061 sheet. This piece is welded to the open end of the camber section to seal it. Vent holes are not needed since the continuous weld is air and moisture tight.

Fans in water cooling towers and radiator-type coolers encounter two common types of corrosive conditions. In the dry or radiator-type coolers, the corrosive atmospheres of industrial plants, plus salt-water atmospheres in sea areas, prevail. In water cooling towers similar conditions may exist, but also to be considered is the corrosive effect of the process water in direct contact with the fan blade.

For less than severe conditions, the corrosion resistance of the aluminum alloys used in fan construction is usually adequate. In some industrial conditions, however, special anti-corrosion steps are necessary. For these instances, Koppers employs one of two systems to give aluminum blades extra protection. The firm calls these systems Special Coating and Super Special Coating.

The Special Coating system is used in severely corrosive atmospheres. In such cases, the blade is given a chromate conversion coating, followed by two sprayed-on layers of a catalyzed epon coating. A neoprene leading edge is applied for erosion protection.

Super Special Coating is applied in cases of extreme corrosive conditions, such as those where stainless steel is inadequate. This system merely consists of a covering of 1/32-inch thick neoprene wrapped over the entire blade with a double thickness at the leading edge.

An iron casting is used for the hub of the small fans, and a steel weldment for the large fans. The small hubs can hold four or six blades, the large ones six or eight blades. Both hubs are designed to provide rib reinforcement at the blade retention sockets where maximum load stress develops.

A ferritic grade of ductile iron is used for the small hub and the two-piece blade retention socket of the larger hubs. This material was selected for its ability to withsand very corrosive atmospheres and high stress, Koppers said.

Since the hub of the small fans and the retention sockets of the large fans are iron and the blades aluminum, prevention of galvanic attack is a must. To do this the iron surfaces are treated with a manganese iron phosphate solution and coated with a heavy-bodied tar base coating that is waterproof, and able to resist acids and alkalies and heat to 400°F.

This coating is covered with aluminum paint. Retention shanks of the aluminum blades are protected with a coat of zinc chromate primer.

Prepared for Assembly

When all blades and hubs for a particular job are completed and properly protected against corrosion, the fans are prepared for assembly. All blades and hub sockets are identified by a part number and letter, and further marked as to direction of rotation, blade tip angle and thrust face. Fans are then checked for balance and prepared for shipment.

Fans can be assembled on location. After the hub is mounted on the shaft the blades are inserted in their respective sockets. Small diameter fans use a safety lock pin and grooved hub socket, which simplifies assembly. The safety lock pin holds the blade in place while allowing its angle setting to be altered without the blade being removed. These fans rotate clockwise or counterclockwise.

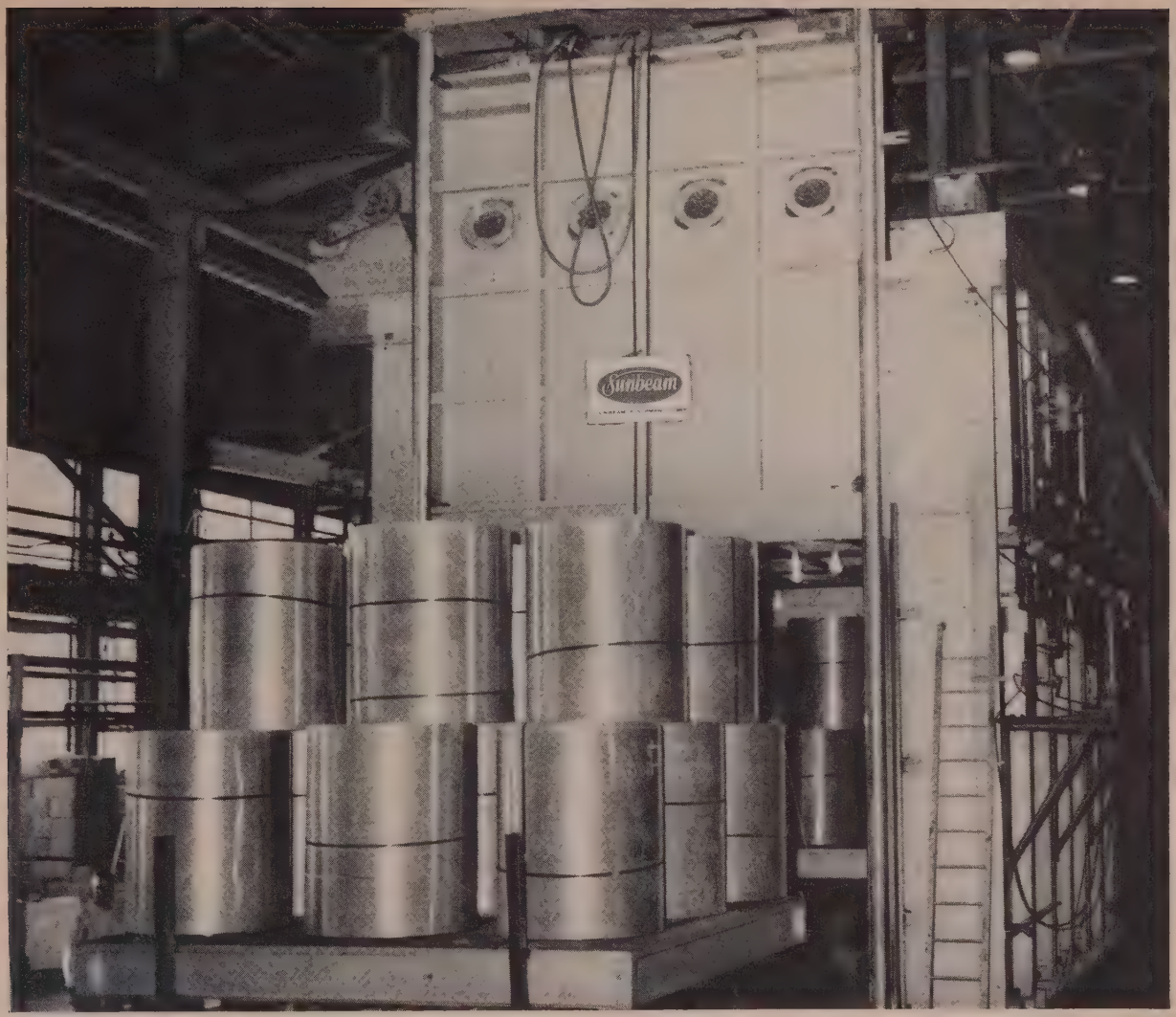
Large-diameter fans are installed in the same way. This operation is simplified by a separate blade retention cap, which allows the hub to be placed on the shaft of the tower and the blades assembled individually. This feature is important in large fans because it eliminates special handling equipment to raise and place the fan assembly.

All blades have an adjustable pitch angle and can be manuevered while the blades are in the hub sockets. This means the load can be quickly changed whenever desired. Within limits, increasing the tip blade angle increases the amount of air delivery and horsepower consumed. This flexibility cuts costs since fan load can be reduced during low demand periods.

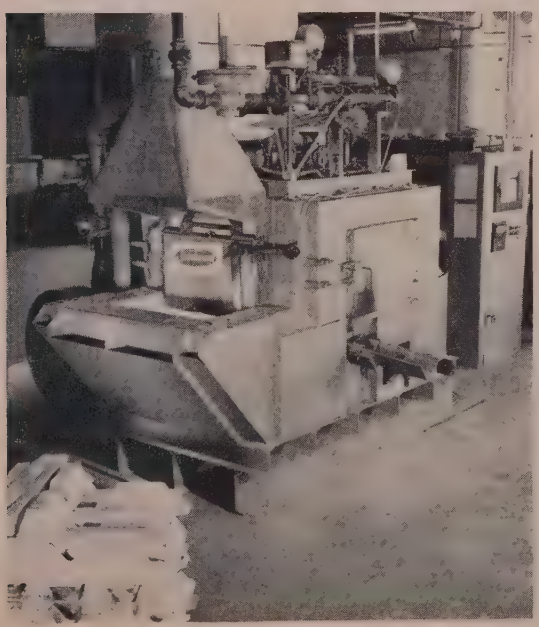
Other Koppers Fans

Among Koppers' other designs is a line of six-bladed, semi-pressure diesel locomotive fans ranging in diameter from 48 to 72 inches. Blades are heat treated castings of aluminum alloy 356-T71.

The heat dissipation demands of diesel locomotive fans increase as the horsepower of the power plant increases. This requires a highly effective fan with the ability to dissipate a large amount of heat within a confined area. This type fan calls for a large hub in relation to fan diameter, a high pitch distribution within the blades themselves, and close fit between the blades and the hub to prevent disturbed recirculation of air at the blade-hub junction.



FROM ONE EXTREME TO ANOTHER



Aluminum heat processing requirements differ. The Melting Furnace to the left is just right for melting small aluminum ingot. But it's a far different story with the 225,000 pound load of aluminum coil pictured above.

Between these two extremes lie all kinds of requirements. To meet the broad range of needs, Sunbeam makes every type and size of furnace equipment for processing aluminum.

This range of experience can be invaluable to you in planning for your own aluminum processing furnace requirements. Your near-by Sunbeam Representative is well qualified to help you. We'll be glad to put you in touch with him.

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Surface Treatments and Finishes for MAGNESIUM

In many of its most outstanding applications, magnesium performs satisfactorily without a surface finish. Where a finish is needed for protective or decorative reasons a broad range of surface treatments are available for nearly any service condition. Several examples are cited in this article, based on a paper presented at a joint meeting of the Magnesium Association (U.S.A.) and the Magnesium Industry Council (England), held this month in London. Other papers will be given in later issues.

by James S. Kirkpatrick, Brooks & Perkins, Inc., Detroit

MAGNESIUM, when fabricated into a product and properly finished, looks much like any other metal product. The end user seldom knows, and usually cares little, what material is in the final product. He trusts the design engineer to have picked the best material at the best cost to do the job required.

Many potential users of magnesium have developed a false fear that the cost of finishing magnesium is excessive. This is entirely incorrect. When magnesium finishing has been handled by automated mass production methods finishing costs have not only been reasonable, but often very competitive with those of other metals.

Example: Bakery Cabinets

In order to demonstrate how magnesium has worked with various finishing systems, we have picked some examples where a reasonably high volume of units have been produced, and where the finishing system has been exposed to the same conditions that would have applied to any other material.

Awrey Bakeries in Detroit have been using magnesium delivery cabinets since 1947 (Figure 1). Baked goods are delivered without wrapping so the unit must be washed every two weeks. The strong hot alkaline bath caused steel cabinets to rust, and also caused a black smut on aluminum units. Magnesium cabinets require no finish. The first cabinets delivered in 1947 are still in use and as attractive as the latest units delivered.

The stator blades of the Chevrolet Turboglide transmission have been made of magnesium in the past two model years because it was the material which developed the lowest unit cost. Usage of these blades is approaching the five million quantity. No finish is required as these units operate in oil.

Window bracket assemblies for major U. S. auto makers is an example of magnesium fabricated into a steel assembly. The entire unit is painted with a baked primer and baked enamel standard automotive finish. Since drainage is adequate, no galvanic couples can be established for any period of time, and magnesium stands up very well.

Most cars made in the U. S. require a spacer block between the fan drive pulley and the fan itself. Millions of these spacers have been made of magnesium. The metal's natural oxide coating, plus oil accumulation from the engine, is sufficient finish.

In 1949, 12 hinged dockboards were installed at Pier No. 6 in Brooklyn. These units, which operate directly above salt water, are in as good condition as when they were installed. This is another example of magnesium's own natural oxide coating giving sufficient protection where no galvanic couples have been designed into the unit.

. . . and Foundry Flasks

Magnesium foundry flasks in use for the past 30 years are in direct contact with damp sand, and no protection is normally given to the steel fittings. Approximately 75,000 of these flasks have been manufactured. Although no finish is applied to the magnesium, corrosion has not been a problem.

In flexible drive couplings excess weight can be a disadvantage. Magnesium has been used in this field for the past five years. No finish is required. Since these flexible couplings are usually in the vicinity of a motor, the oxide coating might pick up some oil vapor.

Precision inspection equipment has been made of magnesium for the past 14 years. If the thickness of magnesium is twice that of steel, the magnesium will be over 70% more rigid, yet weigh only half as much as steel. These units are shipped with Johnson Wax coating, and some have been in operation since 1946.

. . . and Garden Shears

During 1946 and '47, Disston & Sons made several thousand garden shears from magnesium die castings. The die casting was buffed and a clear sprayed bake enamel was applied. Many of these shears are still in operation after 12 years, and this inexpensive finish has proven to be adequate.

Outstanding applications for magnesium have been in the material handling field. Yard ramps, dockboards, dock bridges, portable ramps, two-wheeled trucks, merchandise handling equipment, etc., have worked very successfully. Many of these units have been sold without any type of finish.

In recent years, a shelf life paint has been applied and in some of the newer models bright yellow or orange safety lines have been applied to side rails, etc. Due to the size of many units, the magnesium cannot be pickled after fabrication. In some cases, a wash prime pigmented material is used to give delivery appeal.

Many units have been exposed to all types of atmospheric conditions for years without noticeable deterioration.

The service experience of the Volkswagen engine (Figure 2) is one of the

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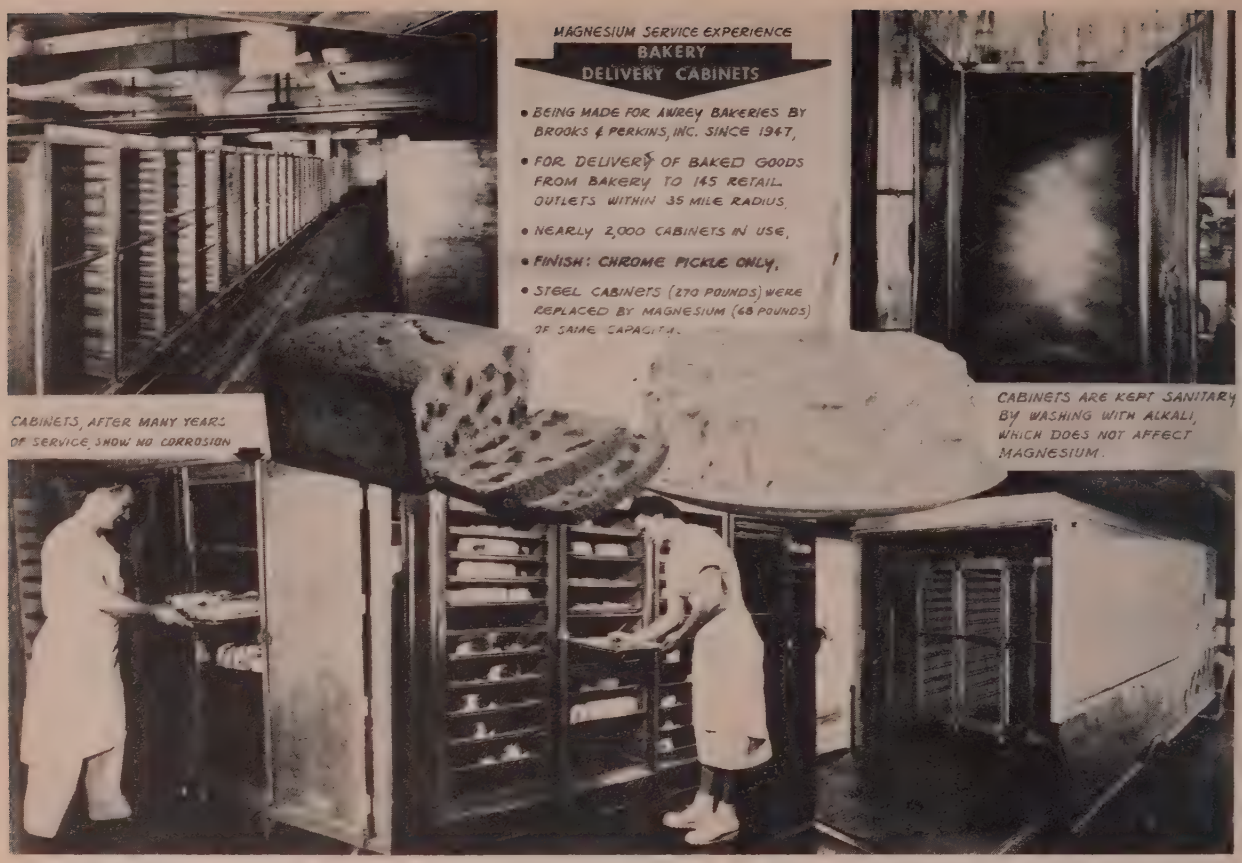

MAGNESIUM SERVICE EXPERIENCE
BAKERY
DELIVERY CABINETS
• BEING MADE FOR AWREY BAKERIES BY BROOKS & PERKINS, INC. SINCE 1947,
• FOR DELIVERY OF BAKED GOODS FROM BAKERY TO 145 RETAIL OUTLETS WITHIN 35 MILE RADIUS,
• NEARLY 2,000 CABINETS IN USE,
• FINISH: CHROME PICKLE ONLY,
• STEEL CABINETS (270 POUNDS) WERE REPLACED BY MAGNESIUM (68 POUNDS) OF SAME CAPACITY.
CABINETS, AFTER MANY YEARS OF SERVICE, SHOW NO CORROSION
CABINETS ARE KEPT SANITARY BY WASHING WITH ALKALI, WHICH DOES NOT AFFECT MAGNESIUM.

■ ***Figure 1. Magnesium bakery cabinets perform better than aluminum or steel; need only simple chrome pickle treatment.***

most outstanding examples of long service life without finish. Well over 3 million of these engines have been used in hot humid climates, deserts, adjacent to salt atmospheres, and in arctic regions.

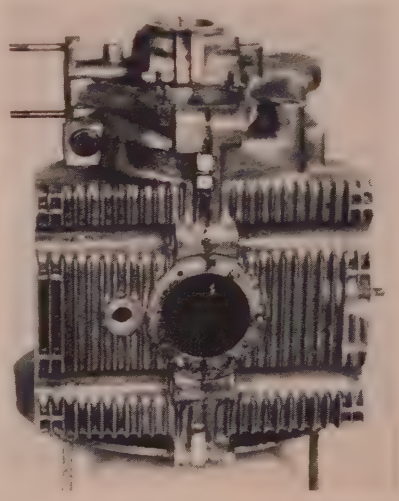
The illustration shows the bottom view of a crankcase after 65,000 miles of service during all seasons in central Michigan. Alloys are AZ-80A and AZ-81A. The camshaft runs directly in magnesium without liners or bearing sleeves. The cars are currently being assembled at the rate of approximately 3000 per day, and have been in production since 1945.

In addition to the 36 pounds of main engine castings, other magnesium parts are the transmission, support brackets, steering gear cover, oil pump housing, and camshaft timing gear. Oil deposits from the engine area are sufficient protection for the magnesium.

In the past 7 years, two anodic treatments have been developed and used extensively on magnesium — the HAE treatment developed by H. A. Evangelides of Frankford Arsenal, and the Dow 17 treatment developed by the Dow Chemical Co.

All anodic treatments for magnesium have been on a custom or job shop basis. If a volume usage of one application could be developed whereby the systems could be set up on a production line basis, the cost of either treatment would probably be comparable to anodic treatments for other metals. This should be borne in mind for any future planning.

Anodic coatings give magnesium excellent paint bases and impart excellent abrasion resistance. When the surface is sealed with a material such as an epon resin and baked, the salt spray life can be boosted to many hundreds of hours. Techniques have been developed for application of various thicknesses of the treatments.



■ ***Figure 2. Bottom view of Volkswagen crankcase after 65,000 miles of use in central Michigan, all seasons. Finish is chrome pickle only.***

The fluoride anodizing treatment developed by Magnesium Elektron Limited is an excellent cleaning process. Magnesium parts are immersed in a 10% solution of ammonium by-fluoride at a voltage of about 120.

Parts treated will withstand 4 to 5 times as many salt spray hours as standard mill products not treated this way. If anodizing is properly sealed, salt spray life will go up to many more hours. While the anodic treatments are relatively new, service experience with them has been excellent.

The body of the oil separator made by Eclipse-Pioneer Division of Bendix Corp. is illustrated in Figure 3. This separator has been in service 14 years. Some corrosion occurred prior to application of the HAE treatment in 1955, when a new system was worked out. This consists of the full HAE treatment (.001-inch), application of Boydell Bros. 17-102 modified epoxy baking clear enamel, a coat of zinc chromate primer,

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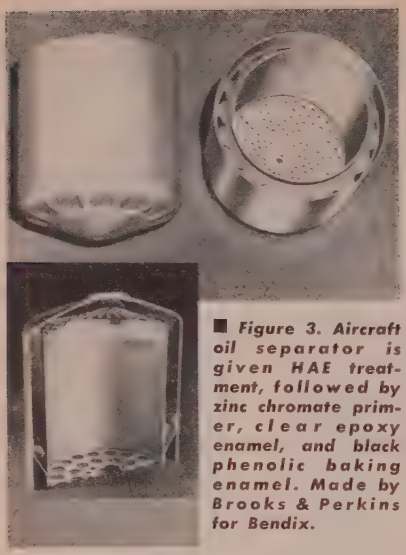


■ *Figure 3. Aircraft oil separator is given HAE treatment, followed by zinc chromate primer, clear epoxy enamel, and black phenolic baking enamel. Made by Brooks & Perkins for Bendix.*

and a coat of black glossy phenolic baking enamel.

Recently, modifications of the Dow 17 process have been announced. The clear anodize, requiring only 40 volts for a short time, gives a thin transparent coating in contrast to the green opaque deposits of the standard Dow 17. A clear baked enamel is applied over the anodized surface, resulting in a very attractive finish similar to wire brushed or clear anodized aluminum. Tinted enamels can be used to obtain a variety of colors.

The Dow 9 galvanic anodize treatment, listed in the handbooks for many years, has recently found some good applications in the rare earth alloys where other treatments are too severe or will not take. This gives a thin adhesive film and retains excellent dimensional tolerances. It is attractive for some electronic applications.

Need Organic Coatings?

Application of organic coatings to magnesium has been successful for many years. Once the proper base coat and primer have been applied, the colors, textures, etc. available for consumer appeal, protection, and resistance to rough handling are the same as for any other metal.

One of the most outstanding examples of the value of organic coatings are the chain saws manufactured by a number of companies. Two of the larger companies in this field — Homelite Co. and McCulloch Motors — have manufactured hundreds of thousands of chain saws in various models and sizes. Typical finishing cycles employed by these companies are shown in Figure 4.

In 1955, Mr. S. H. Egbert of McCulloch Motors made the following statement: "Magnesium is a challenge to the manufacturer with imagination. It has been in good measure responsible for our success in the chain saw business."

Five years later, all chain saws use a high percent of magnesium die castings. No new or unexpected finishing problems have arisen. It is estimated that chain saws are being produced at the rate of about 400,000 per year. It is too bad that more people are not aware of the outstanding job that finishes have done on this product.

One of the most outstanding users of magnesium is the Dictaphone Corp. Their dictating and transcribing machines use magnesium exclusively. The cover, main frame, supports, base, and carriage are die castings. In their small Dictet, the case and the cover are die cast magnesium and several of the drive wheels are made from magnesium bar stock. These operating parts are HAE treated for protection and superior resistance to abrasion.

The Time Master parts which are not painted, are vapor degreased in trichloroethylene, immersed in chromic acid, cold water, hydrofluoric acid, and rinsed in cold water. This is followed by an Iridite 15 chromate conversion treatment, then a rinse in cold water, then in hot water, and oven dried.

Castings Finished With . . .

The magnesium castings which are to be painted are processed in a shorter cycle which omits the chromic acid and hydrofluoric acid treatment. This process consists of degreasing, immersion in Iridite 15, followed by cold water rinse and oven drying.

The parts are then primed with phenolic-modified alkyd amine resin and given a finish coat of alkyd amine paint. Both the primer and finish are applied by an electrostatic spray system, then oven baked.

The Dictet is a light weight pocket size tape recorder which must stand hard handling. Parts for it are degreased, Iridite 15 chromate conversion coated, then rinsed and dried. Next a gray epoxy base primer is applied to all surfaces, followed by a baking cycle. A light coat of aluminum pigmented epoxy paint is applied and baked, followed by a clear epoxy coat. The clear coat is baked, lettering is silk screened, then baked.

The final finish is an additional coat of clear epoxy which is applied over the silk screening and baked.

Protecting Military Gear

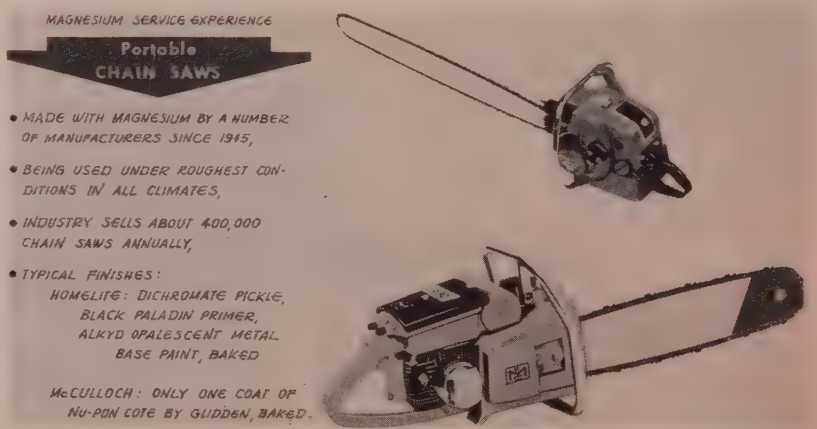
The miniaturization of electronic equipment has caused a problem of heat dissipation. Electronic components can be mounted on a magnesium "cooler plate." Magnesium has developed a sufficient family of finishes that cooler plates or electronic chassis can be manufactured to give the proper conductivity, salt spray life, RF ground, etc.

In some later models the HM-21 thorium alloy is used, with very thin sections and very light weight module covers which have a resistance to deflection at elevated temperatures. This yields one of the lightest, best electronic module package covers that can be made at present.

For the past 12 years, pilot ejection seats have been made from magnesium stampings. This unit is used as a storage for survival equipment. When difficulties arise, the pilot is blown clear of the plane by an explosive charge. The seat pack is strapped to the pilot.

This unit, which is made by Brooks & Perkins, Inc., is given a finish consisting of dichromate pickle, followed by zinc chromate primer, and a finish coat of green-gray baked enamel. The finish has stood up well under operating conditions.

The Kleinschmidt Division of Smith Corona Marchant has been using magnesium in Signal Corps teleprinters for the past 10 years. Many different models have been built including teleprinters,


MAGNESIUM SERVICE EXPERIENCE
Portable
CHAIN SAWS
• MADE WITH MAGNESIUM BY A NUMBER OF MANUFACTURERS SINCE 1945,
• BEING USED UNDER ROUGHEST CONDITIONS IN ALL CLIMATES,
• INDUSTRY SELLS ABOUT 400,000 CHAIN SAWS ANNUALLY,
• TYPICAL FINISHES:
HOMELITE: DICHROMATE PICKLE, BLACK PALADIN PRIMER, ALKYD OPALESCENT METAL BASE PAINT, BAKED
McCULLOCH: ONLY ONE COAT OF NU-PON COTE BY GLIDDEN, BAKED.

■ *Figure 4. Chain saws exemplify the use of magnesium to save weight. Shown here are finish systems used by McCulloch Motors and Homelite Co.*

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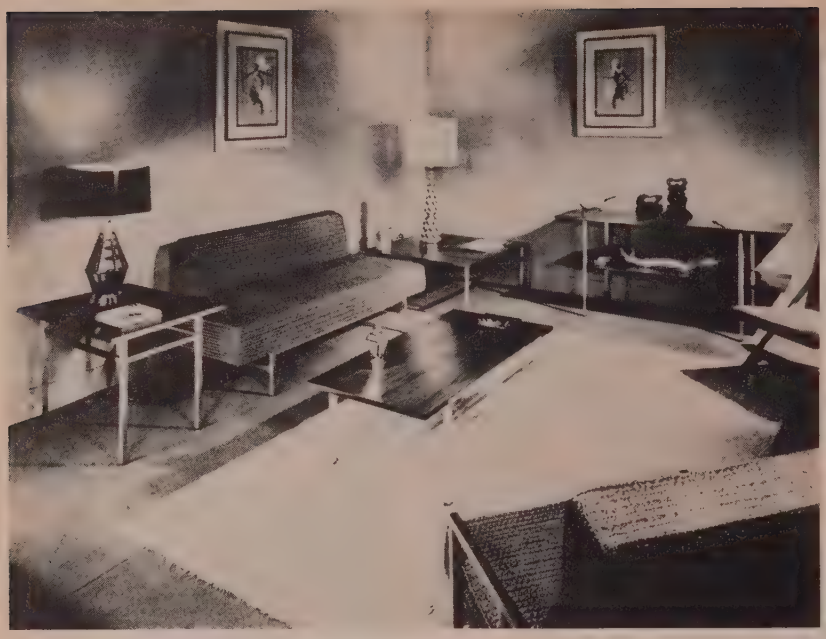


■ *Figure 5. Thousands of pieces of magnesium-framed furniture, made by Mueller Brothers, Grand Rapids, Mich., have been put in service since the line was introduced in 1953. An attractive finish is imparted by polishing with steel wool, then applying bright chrome dip and clear baked enamel.*

transmitter, code and recode, perforator and tape transmitters.

The finish system is a dichromate pickle, zinc chromate primer and then the proper baked enamel for the unit involved. HAE coating is applied to the tape guide channel which has given extremely successful resistance to abrasion as the paper runs over this area.

During the past seven years, Mueller Brothers, Grand Rapids, have been manufacturing magnesium furniture (Figure 5). Many thousands of pieces of this furniture are in use. A finish system which has proven adequate for this job is a steel wool bright buffing, bright chrome dip, and a baked clear enamel.

Plating Printing Plates

The electroplating of magnesium, now an accepted process, is well exemplified by its use on the photoengraving sleeves used by the Dixie Cup Division of American Can Co. The sleeve is turned from extruded tubing in the rough with the inside diameter approximately .002 inch smaller than the body diameter of the cylinder that it is to be used on. It is then heated to expand the diameter so that it can be shrunk onto the mandrel.

The outside diameter is turned to a very fine finish and to the exact pitch diameter of the plate cylinder gear. It is then ready for the engraver to "step repeat" the design around the circumference of the magnesium sleeve and etch to a depth of .040 to .045 inch.

After etching, the magnesium sleeve is given a copper flash plate and a hard chrome mat finish which makes it compatible for ink transfer and lay-down. The copper flash is approximately .00036 inch thick, the mat chrome finish, .00015. The sleeve is then heated over a ribbon gas flame to expand the inside diameter for shrinking onto the cylinder.

The life of these cylinders is 8 to 12 million impressions, depending on the printing, design, finish of paper, type of ink, etc. Dixie Cup uses approximately 2000 new cylinders each year.

Another use for electroplated magnesium in commercial printing is the Maralite printing plate. The magnesium alloy is bent to a very precise curve; etching is carried on after curving. When the plate is finished it is cleaned, given .003-inch copper and .002-inch chrome plate.

One advantage of the magnesium plate is that the lugs which hold it to the press do not have to be tightened so tightly as for heavier materials. The plate can be taken off and reused time and again without damage to the holding area.

In 1957, the magnesium industry was called upon to develop the satellite shell and structure for the Vanguard program. Two magnesium spheres are still in excellent orbit. The finishing system for the satellite is probably the most sophisticated metal finish developed on any metal. The state of the art was pushed ahead 10 years in two years.

Electroless nickel plating of magnesium is being given limited experimental use at present. One of its great advantages is the ability to plate in areas which could never be handled by the normal electrolytic process. Not enough service experience has been generated to determine how extensive the use of electroless nickel plating will become.

New to magnesium, but old in the state of the art, is the application of vinyl plastic. Shwayder Brothers, Inc., of Denver, Colorado have produced nearly two million pieces of magnesium luggage coated by this method. This beautifully designed unit will take tremendous abuse. The current streamlined version of this luggage is known as the Silhouette (see Figure 6).

The methods of applying porcelain enamel to magnesium have been known for many years. This is a new and rapidly expanding technology. The ability to apply porcelain enamel should make magnesium applications available which were heretofore impossible — especially in the extreme salt corrosion environments, and for sea going equipment.

A company using current techniques in magnesium finishing is the Ryan Aeronautical Co., San Diego. Three-quarters of the exterior of the Ryan Q-2A Firebee jet target missile is made of magnesium alloy.

The finishing system for the Firebee is alkaline cleaner, rinse, hydrofluoric acid, rinse, 30 minutes in hot sodium dichromate, rinse, dry, spray paint with one cross coat of BuShips wash primer (phosphate acid catalyst), vinyl-zinc chromate seal primer, and vinyl-alkyd gray paint. Exterior surfaces are then given one coat of aircraft gloss enamel. Ryan's tests have indicated that this system gives them a corrosion-free part after 400 hours of salt spray.

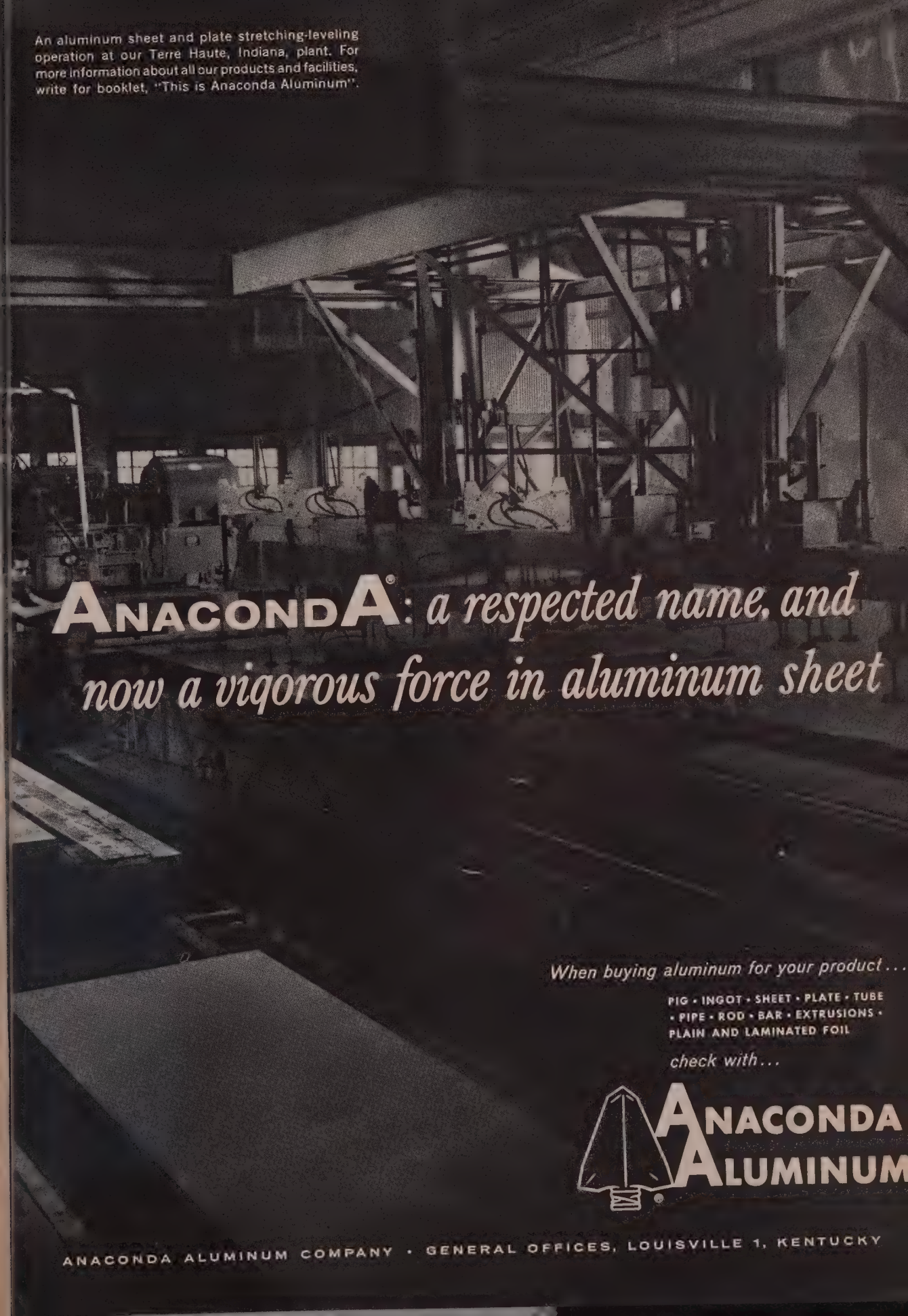
To Lick Galvanic Corrosion

Certain design criteria must be taken into account to achieve finishing results such as have been illustrated here. Magnesium's worst enemy is galvanic corrosion — two dissimilar metals joined mechanically in a section of equipment and immersed in an electrolyte.

If the severity of exposure is not too great, primed parts at the faying service will resist galvanic corrosion. This technique has been worked very successfully on Air Force aircraft.

Magnesium/is the most susceptible of all metals to this type of corrosion. Many designers have confused it with general corrosion. A thorough understanding of this potential problem is a must for all who design magnesium equipment.

Many items which were once magnesium are now produced in some other metal or plastic. The inability to properly finish magnesium has often been used as an excuse for not using it. However, in most cases, the loss of the



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■ *Figure 6. One of magnesium's most outstanding applications is in famous Samsonite luggage. After a special chromate coating, magnesium is given a .015-inch coating of vinyl in variety of colors and textures. Almost 2 million pieces of luggage have been sold since 1955. Principal components of case are shown at left.*

product to magnesium was caused by another material being lower in cost. This is an economic problem, not a finishing problem.

When the new Dow Plant in Madison, Ill., required a mass production automated spray pickle line, this equipment was designed and built and has operated successfully. It can handle magnesium up to 1 inch thick and 72 inches wide. It can be used to apply the acetic-nitrate clean-up pickle, chrome pickle, or for removing oil, chrome pickle and stencil ink from sheet.

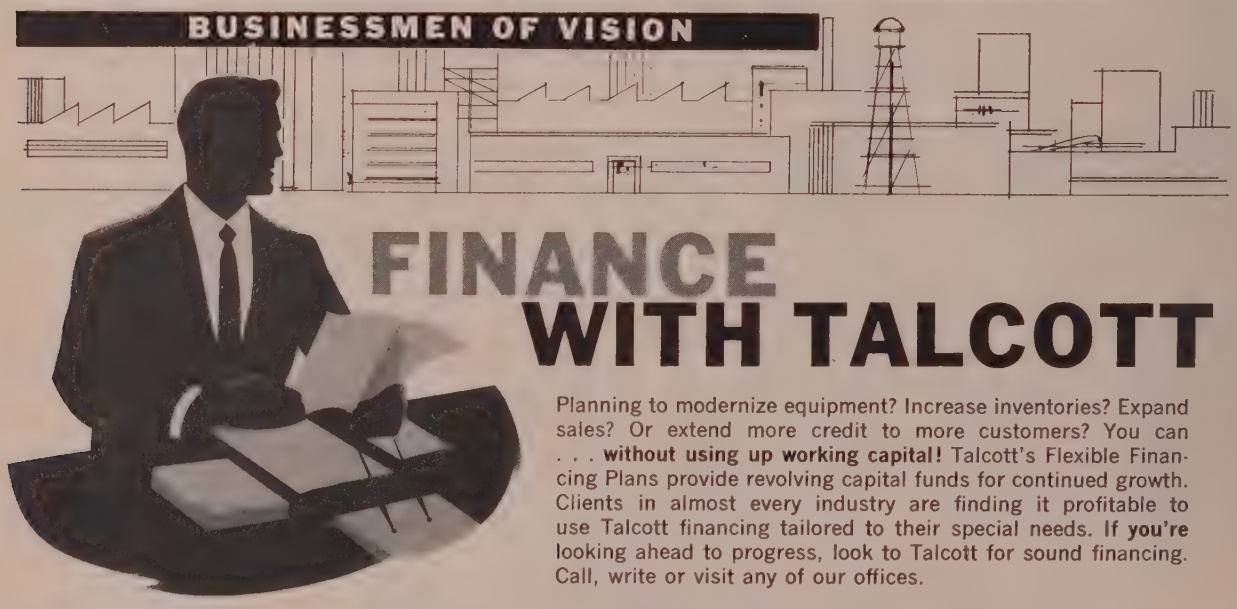
Line Speed: 50-300 fpm

Magnesium sheet is propelled through the line by 72 rubber pinch rolls at speeds from 50 to 300 feet per minute. The sheet is contacted by spray action in each tank. The usual process is alkaline clean, cold water rinse, acid pickle, cold water rinse, and hot air drying. The line is 175 feet long and consists of 8 tanks plus vacuum plate piler and steam heated hot air dryer.

The pickle composition is controlled automatically by two titrators that take a sample every 15 minutes, record the magnesium content and acid content of the solution in the line and in the ion exchange tanks. Spent pickle is removed from the line tank, purified by ion exchange, and returned to the pickle line, entirely by automatic instruments.

Saran rubber, Saran lined pipe, 316 stainless steel, and 3S aluminum are the major materials of construction in contact with the acids.

It is hoped that this paper gives enough factual data so that people who are given the task of selling magnesium will be able to cope with those individuals who still maintain a prejudice toward magnesium finishing.



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Extrusions Simplify Ceiling Grid System

Patented grid system of Southern Extrusions is fast erecting, requires no tools, can be dismantled with minimum trouble for repairs or replacements.

THE greater the flexibility of a grid system for acoustical ceilings, the greater its value to ceiling contractors. Go one step further and design a system that can be installed easily and you've really got something.

Right now, Southern Extrusions, Inc., Magnolia, Ark., has such a system in the form of Speed-Lock, its newly developed system of aluminum extrusions for hung acoustical ceilings.

"Our primary objective was to provide the acoustical industry with a suspended grid that could be easily adapted to any ceiling," said H. N. Sebring, president of the extrusion firm. "We've combined the most desirable qualities — strength, light weight, simplicity of design and speed of installation — to save man-hours on the job."

Southern Extrusions' own engineering staff conceived Speed-Lock. It allows installation without the time consuming task of attaching clips or bending at each joint of the cross tee to the main member. Once the wall angle and the main tee members are in place, no tools are needed to put up the cross tees.

Sebring attributes Speed-Lock's simplicity to the patented "key slot" design which permits rapid, trouble free attachment of cross tees to the main tee members.

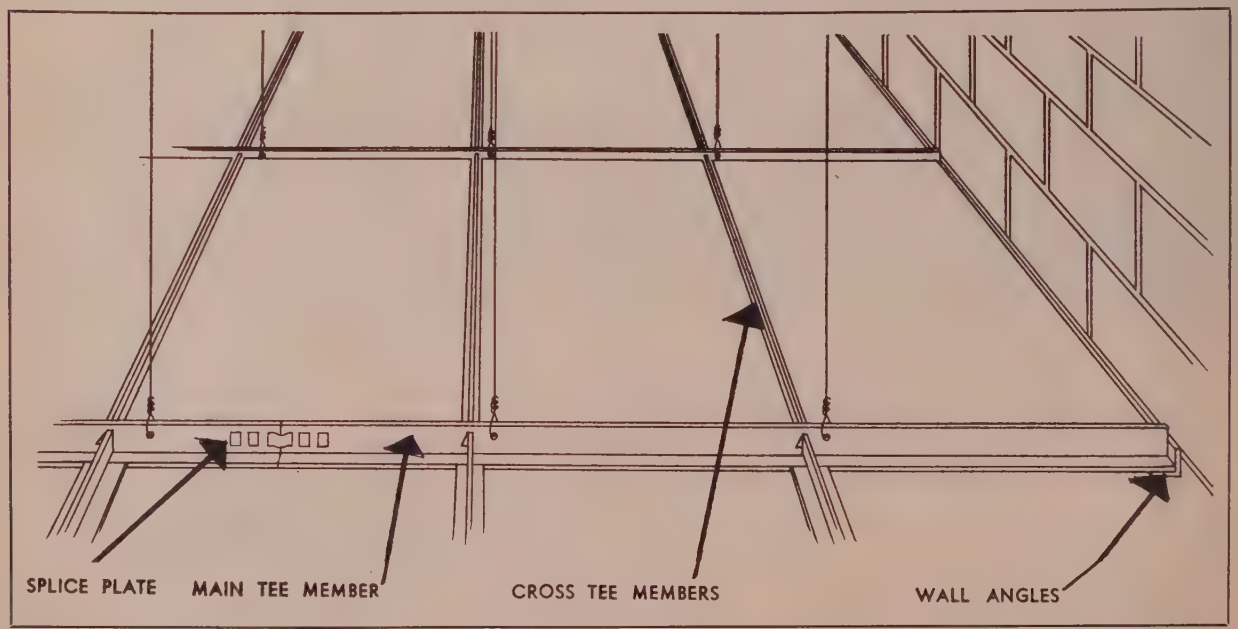
Weight No Obstacle

There are two sizes of cross tees and two types of wall angles, the shelf-like extrusions which are installed around the perimeter of the space to receive the extremities of the grid. The contractor uses one or the other, the heavier member being used where a greater span is required or where the acoustical panels or light fixtures are unusually heavy.

Finding the right key slot design required much experimentation. One approach would involve use of clamps or clips to lock cross tees to the main tees. This was discarded in favor of a design which would eliminate the need for hand tools and thus be more simple. Elimination of a third component in the connecting process naturally increases the savings in the production and installation of any ceiling system.

It was decided that not only should there be simplicity of assembly of the system but simple tooling in order to facilitate production. The key slot was an answer to this problem since it required only a shearing action with no bending required either in the main or cross tee members.

Southern Extrusions made a long, gang type press to permit fabrication of a complete part. In one stroke of the press, 17 operations are performed on these 15-foot members. It punches out key slots on 12-inch centers, assures the exact length of the main member, and



■ ***Speed-Lock system for hung acoustical ceiling rests on aluminum angles at the extremities and is hung on flat plane by wire cords from rafters or roof. Four aluminum components comprise the system which is notable for its ease and speed of installation. Speed-Lock was conceived by Southern Extrusions' engineering staff.***

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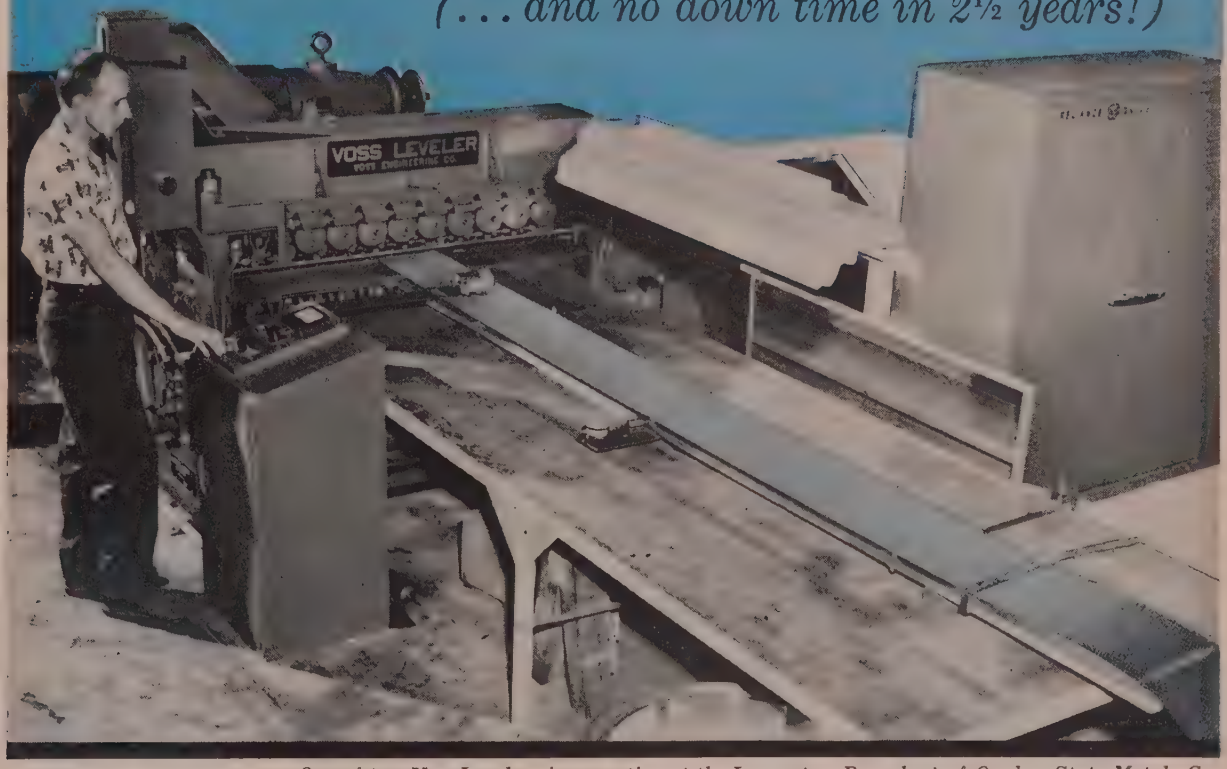

One of two Voss Levelers in operation at the Lancaster, Pa., plant of Quaker State Metals Co.

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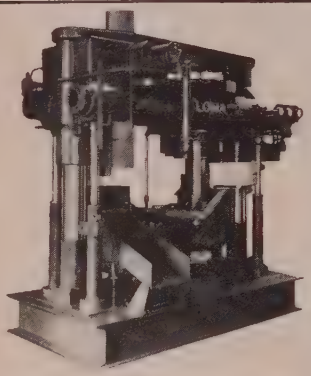
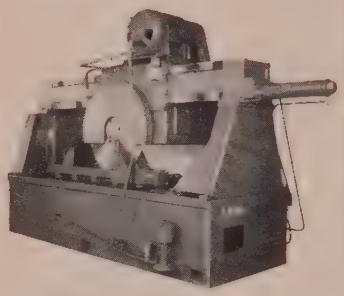
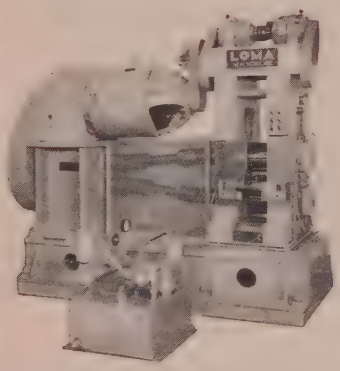


CONTINUOUS CASTING MACHINES



CIRCULAR SAWING MACHINES



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■ *"Waterfall" arrangement of hung ceiling sections is appropriate for the "business" end of this modern bowling alley; and Speed-Lock system lends itself well to this ceiling design.*

punches out splice-plate adaptor slots in each end.

Cross members are also gang-punched, providing a left and right end on each cross tee member.

In the Speed-Lock system the key is composed of a vertical slot plus a slot punched 45° to the vertical and intersecting at the top of vertical slot. The metal between these slots is removed down from the top to a point just below the center of the vertical slot. This forms a figure similar to the numeral four on a typewriter.

When a cross member is inserted in the vertical slot on one end, it fills the bottom half of this vertical portion of the key. The next cross member has an opposite end formed so as to twist and insert into the 45° portion of the key and then is rotated and set over the top of the previously installed cross member. This prevents the first cross member from being lifted out of the bottom half of the key.

The second cross member cannot come out of the top half of the tee because its opposite end forms the bottom half of the key in another main member. Since it cannot turn unless forced to do so by hand, the member is completely secured in the key slot.

There is enough tolerance allowed in the punching of the cross members and the key slot to allow for any expansion and contraction in the entire grid system, according to Sebring.

"This increases the versatility of Speed-Lock so that it may be used for any grid pattern desired," he said.

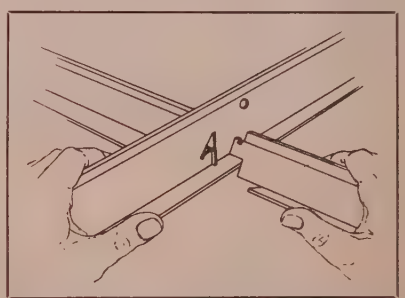
Speed-Lock has been adapted to the unique "waterfall" design. With the multiple punching of the main members, the normal step patterns and rectangular and square patterns can be used at any time or place in the system.

The easy removal of cross members facilitates remodeling or installation of telephone systems, air conditioning ductwork, and other types of service lines which may become necessary as the building grows older.

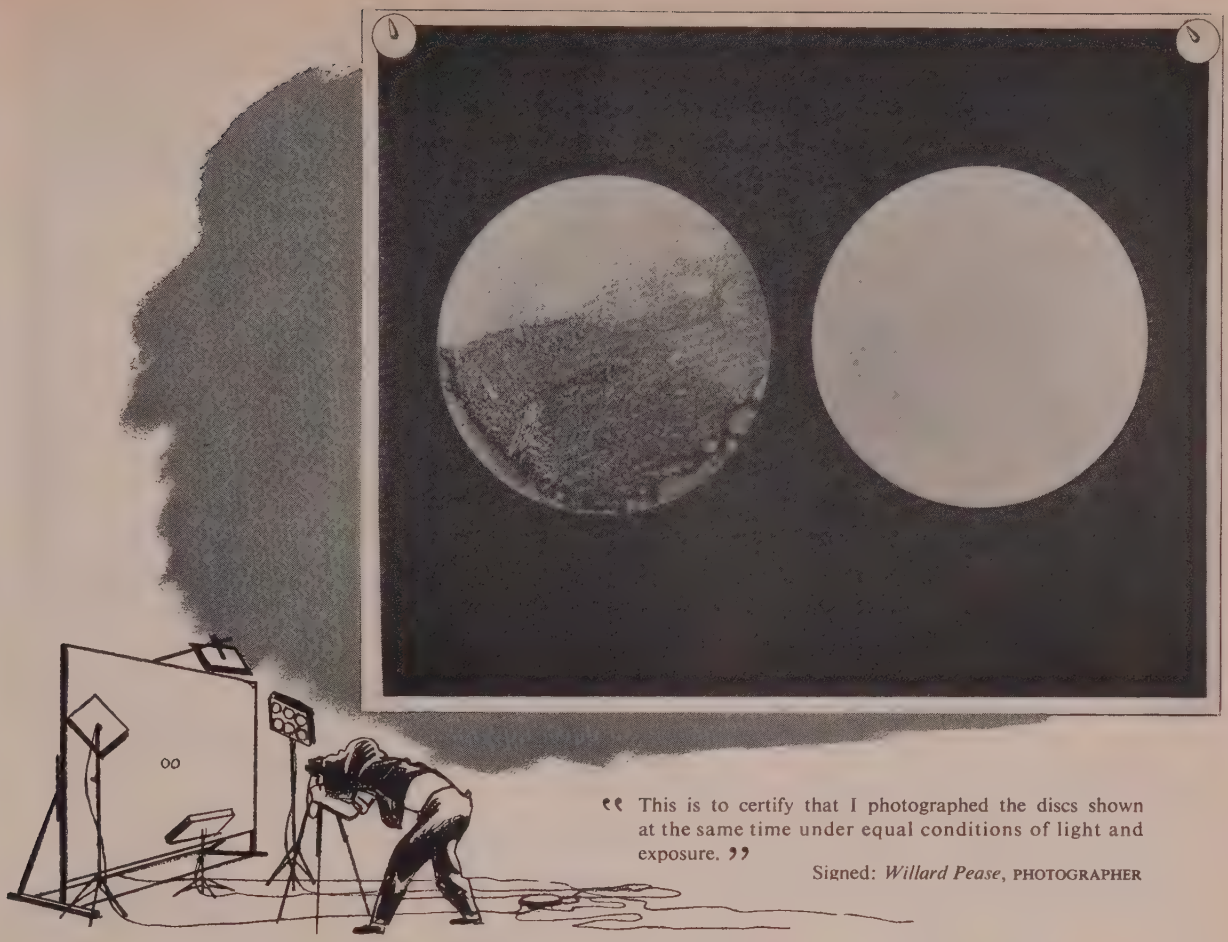
"Having been in the acoustical grid business for many years before we designed Speed-Lock, we were well aware of the need for a system that would lend itself conveniently to improvement and repair," Sebring points out. "This need is well satisfied by Speed-Lock. With just a few minutes' study, any workman who has installed acoustical systems will be more than happy with this system's helpful features."

The new system has been in the field for more than two years and won great acceptance by architects, engineers and installers, according to Sebring. Southern Extrusions produces the entire system and keeps a large inventory of all parts in the satin and anodized finish. Other finishes are available on request.

Speed-Lock is marketed exclusively to acoustical ceiling contractors.



■ *Notched components join simply, require no tools or clips, can be dismantled just as quickly.*



"This is to certify that I photographed the discs shown at the same time under equal conditions of light and exposure."

Signed: *Willard Pease*, PHOTOGRAPHER

A PICTURE IS WORTH 1,000 WORDS!

The above photograph clearly shows that the disc at the right, which was coated with Kerns Kleen Strip© 485 Aluminum Rolling Oil, has no stain whatsoever and is twice as bright as the disc at the left which was coated with a commonly used product.

Both aluminum plates were tested and photographed under the same conditions. They were heated for 30 minutes at 650° F., then photographed with the same camera, light, distance and lens settings.

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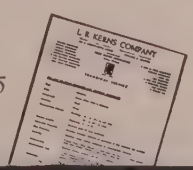

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Welding Aluminum

Part 1: General Welding Processes

This is the first of an extensive series of articles on welding aluminum. This first installment contains brief descriptions of most of the welding processes to be detailed in later articles. Other topics to be covered include supervision, quality control, safety practices, and pre-weld and post-weld operations.

Based on information supplied by Aluminium Laboratories Limited, Research Division of Aluminium Ltd.

ALUMINUM and its alloys can be joined by a wide variety of welding processes, usually with standard equipment, though some processes require modified or specially developed facilities to produce high quality welds. Each process has certain advantages and limitations which must be carefully considered by the designer or fabricator so that the most suitable method is selected.

The main features of each process are briefly described here. In coming issues of MODERN METALS those processes most useful to the aluminum fabricator will be fully treated in individual articles.

Argon tungsten arc (TIG) welding is a process in which an A.C. electric arc is maintained between the work and a non-consumable tungsten electrode within a shield of argon gas. Filler alloy is added separately.

Outstanding feature of the TIG process is the complete absence of fluxes. This is possible because the arc in certain inert gases such as argon, and under proper conditions, removes the oxide film, while the shield of inert gas prevents its reformation on the molten metal. Thus, weldments are clean and bright and require no flux removal and little, if any, finishing. Under certain conditions they also have a sounder structure than welds made under normal conditions by any other process.

TIG: Quality and Speed

TIG equipment is more expensive than that for oxy-gas or metal arc welding but this is more than offset by the higher speed and quality of welding, wider range of application and the absence of flux removal operations. However, it is less expensive than MIG welding equipment.

Generally, TIG welding is used to produce X-ray quality welds in material from 0.020 to 0.375 inch thick. Thicker material may be joined by this process if MIG welding is not available. The process is suitable for manual welding in all positions and for machine welding without the addition of filler.

Inert metal arc (MIG) welding is a process in which a D.C. reverse polarity electric arc is maintained between the work and a consumable aluminum electrode (filler wire) in a shield of inert gas such as argon. This process is particularly suitable for all-position welding of aluminum and its alloys. No flux is required, which eliminates danger of corrosion by flux residues.

MIG Is Semi-Automatic

Since it is a semi-automatic process, the training of operators is greatly simplified. X-ray quality welds can be made at speeds of 2 to 4 fpm with manual welding and up to 15 fpm with machine welding. High current densities, which result in a high heat transfer efficiency, are employed.

These characteristics result in higher rates of metal deposition and faster weld zone cooling than in TIG welding. Also, deep penetration is easily obtained. However, when welding the thinner gauges the quality of the deposited metal is slightly more difficult to control than with the TIG process.

MIG equipment is more expensive than that required for the other fusion welding processes. This is usually more than offset by the very high welding speed, wide range of application, quality of the weld and absence of flux removal. In addition, fewer units are necessary to do a given amount of welding in a given time due to the high welding speed.

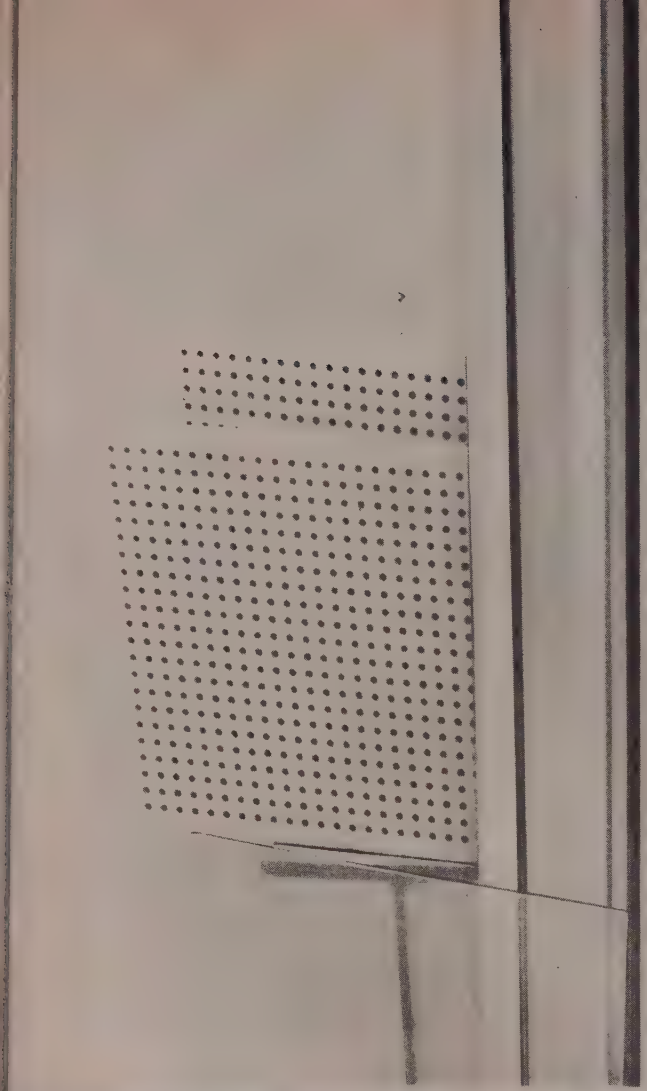
MIG is used extensively on manual welding applications involving material 0.125 inches and up in thickness. Recently developed equipment has extended the useful range of this process, particularly on machine welding, to material as thin as 0.032 inch. There is no limit to the thickness of aluminum that may be welded by this method. Machine welding with MIG equipment is very practical since the process is partially automatic already. MIG welding can be used only where filler material can be added.

Metal arc welding is a process in which a D.C. electric arc is maintained between the work and a flux coated electrode which supplies the filler material. It possesses many of the good features of arc welding but has rather poor arc control and requires flux coated electrodes. The flux is a potential source of corrosion, especially between faying surfaces, and its removal is recommended. Metal arc welding equipment is readily available in most shops.

Metal Arc for Short Runs

Metal arc welding may be used for joining aluminum and its alloys, preferably above 0.125 inch, where quality is not of prime importance, and the quantity of work is small. It is only used if inert-gas-shielded arc welding equipment is not available. It is not recommended for the fabrication of pure aluminum which must be resistant to chemical attack or for any application where the presence of flux is objectionable. Metal arc welding of aluminum is restricted to manual methods, principally in the flat position.

Carbon arc welding is used only occasionally. In it, heat is supplied by a D.C. electric arc between the work and



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a carbon electrode. Filler wire is added separately. A flux is required, which should be removed to prevent corrosion.

Before inert-gas-shielded arc welding equipment became available, carbon arc welding was used in machine welding aluminum in the thicker gauges.

Atomic-hydrogen welding is a process in which an A.C. electric arc of relatively high voltage is maintained between two tungsten electrodes in an atmosphere of hydrogen gas. Filler material, if required, is added to the joint separately. Also, a flux is required, the removal of which is recommended. Atomic-hydrogen welding is used to a limited extent and only on the thin gauges of aluminum.

Stud welding is an arc welding process in which an electric arc is drawn between the work and an aluminum stud, or similar part, until the parts are heated sufficiently, at which time they are brought together under pressure. A specially shaped tip is used on the electrode. An inert-gas-shield has been found beneficial where optimum quality is required.

Stud welding is finding increased use wherever it is necessary to attach thermal insulation, sound-deadening material, etc., to aluminum. The preferred alloys for studs are 4043 and 5056. Present limitations of stud diameter are from 1/16 to ⅜ inch. In stud welding of aluminum high currents of short duration are required which in turn necessitate the use of large leads to reduce the voltage drop.

In oxy-gas welding, heat is supplied by a flame obtained from the combustion of a gas, usually acetylene, with oxygen. The filler material is added separately, if required. This process depends on an active flux which should be removed. The equipment for oxy-gas welding is inexpensive and readily available. Oxy-gas welding is used mostly in the joining of the thinner gauges of aluminum and for repair welding when the inert-gas-shielded processes are not available.

Brazing is a joining process in which coalescence is obtained by heating the parent metal to a temperature just below its melting point and adding an aluminum filler alloy, which is molten at a few degrees below that temperature, using an active flux. The filler alloy is distributed uniformly between the closely fitted surfaces of the joint by capillary action. Heat may be supplied by an oxy-gas flame, an air furnace or molten flux bath.

The strength of a brazed joint is comparable to that of an oxy-gas welded joint while the tendency toward distortion is greatly reduced. Brazed aluminum assemblies present a good appearance with smooth fillets that require a minimum of finishing, if any. An active flux is required and it must be removed completely after brazing. Brazing may be used successfully on material 0.006 inch and up in thickness depending on the shape of the part. It is particularly useful for joining thin sections to thicker sections of sheet, extrusions and tubing as well as complicated assemblies with relatively inaccessible parts.

In resistance welding, coalescence is obtained by the heat produced from the resistance of the work to the flow through it of a large electric current and by the application of pressure. Spot, seam and flash welding are the resistance methods used most widely on aluminum.

Resistance welding joins aluminum and its alloys fast and economically and offers a low cost per weld rate on a mass production basis. Resistance welding is applicable to all aluminum alloys but particularly so to the heat-treatable alloys which are difficult to weld by the fusion processes. Equipment is readily available but the types recommended for use on aluminum are relatively expensive.

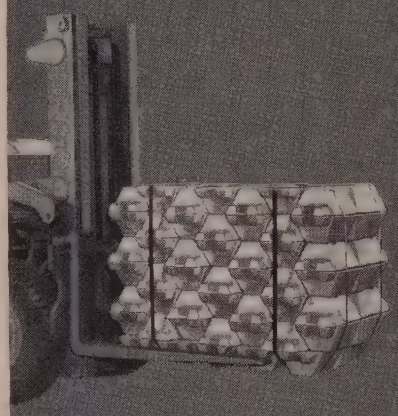
Spot and seam welding are in general use for the effective joining of aluminum

RELATIVE MERITS OF MAIN FUSION WELDING PROCESSES*

APPLICATION CONSIDERATIONS	INERT METAL ARC WELDING	ARGON TUNGSTEN ARC WELDING	METAL ARC WELDING	OXY-GAS WELDING
ECONOMICS				
Cost of equipment	4	3	2	1
Maintenance of equipment	3	3	1	2
Operating factor	1	2	4	3
Training time for operators	1	2	3	4
Volume of metal deposited	1	2	4	3
Welding rate	1	2	3	4
VERSATILITY				
Welding of sheet under 0.050"	–	1	–	2
Welding of material over 0.125"	1	2	3	4
Welding of Al.-Mg. alloys	1	1	4	–
Position welding	1	2	–	–
Use on short irregular welds	2	1	3	4
For abrupt changes of contour	2	1	3	4
Low speed welding where necessary	4	1	3	2
WELD QUALITY				
Strength	1	2	4	4
Ductility of Weld	1	1	4	2
Corrosion resistance	1	2	4	4
Absence of defects	2	1	4	4
Penetration	1	3	2	4
Distortion	1	2	2	4
MACHINE WELDING				
With addition of filler	1	2	–	–
Without addition of filler	–	1	–	–
Thin gauge butt joints	2	1	–	–
Thick gauge butt joints	1	2	–	–
Fillet welds	1	2	–	–
WELDING OF CASTINGS				
General reclamation	2	1	–	–
Reclamation to specification	2	1	–	–
Fabrication with castings	1	2	–	–
Repair welding	2	1	4	4

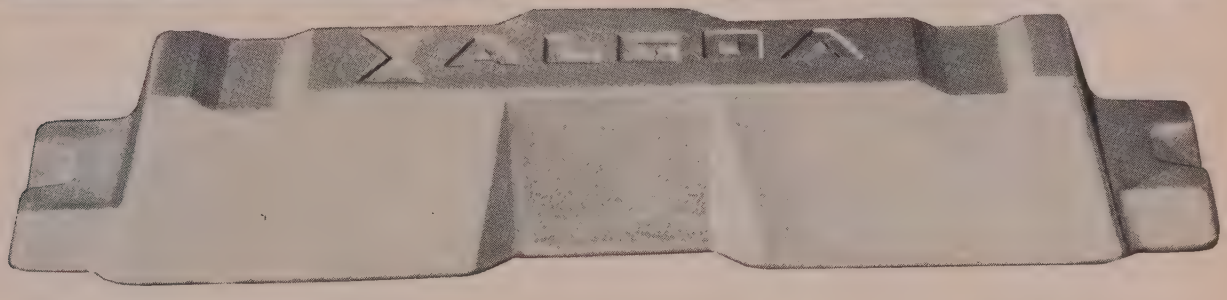
*Numbers indicate usual order of preference; 1 indicates first choice.

Alcoa's new low-silhouette parallel-stacked bundle provides the answer to small furnace-door openings for users who charge whole bundles at a time. Only 30 in. high, this bundle contains 47 pigs and weighs 2,350 lb . . . yet, thanks to Alcoa's new interlocking pig and four steel straps, it's just as safe and easy to handle as the standard bundle.



ALCOA ANNOUNCES A NEW 50-POUND INTERLOCKING PIG

Standard bundles of Alcoa's new 50-lb interlocking pig are cross-stacked and look like this . . . when we ship them and when you get them. Made up of 44 pigs in a 2,200-lb package, bundles are designed for fork truck handling, but are stable enough for transfer with crane and slings.



. . . DESIGNED TO CUT YOUR HANDLING COSTS

Alcoa, the company that pioneered steel-tied bundles for aluminum pig and ingot, has now come up with a better bundle. Thanks to a new interlocking feature and other design changes cast into Alcoa's 50-lb pig, bundles are tighter and more compact. Pigs can't be jarred out of position in shipment. You'll move bundles out of the railroad car or truck trailer faster, move them through your plant with greater speed and safety, then stack them higher. And these benefits, as every operating man knows, add up to real economies.

In its continuing effort to satisfy all customer needs, Alcoa spent several years consulting with customers and testing bundles under every conceivable condition. The design finally adapted incorporates a simple side-to-side locking device. Strapping, too, underwent exhaustive testing both in the laboratory and under actual shipping and foundry conditions. Two straps were found to be barely adequate, three better, and four best . . . for maximum safety and stability. Alcoa's 50-lb pig will all be bundled with four steel straps.

Available in either of the two bundles illustrated, Alcoa's new interlocking pig may also be ordered for shipment in polyethylene bags if desired. For full details and your free copy of Alcoa's new booklet listing all grades and alloys in pig and ingot form, contact your local Alcoa sales office or write: Aluminum Company of America, 2119-F Alcoa Building, Pittsburgh 19, Pa. World-wide sales through Alcoa International, Inc., 230 Park Avenue, New York 17, N.Y.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

where the thickness of the thinnest piece is not over ⅛ inch. Thicker material can be spot and seam welded on special machines. Flash welding can be used to join aluminum and its alloys in the form of plate, tubing, extrusions, wire, rod and bar having a cross-sectional area up to approximately 2 square inches. It can also be used to join aluminum to copper and other metals.

Pressure welding is a process in which pressure is used to make the weld, usually without the assistance of heat, but with a large amount of deformation. The strength of pressure welds depends on the geometry of the welded joint section. Pressure welds, if properly made, have good pressure holding characteristics and good corrosion resistance. However, careful preweld cleaning and joint design are necessary to obtain optimum results. Potential applications of pressure welding exist in the fabrication of sheet and foil assemblies, electrical connections and the joining of aluminum to other malleable metals.

Soldering is the bonding of metals by means of heat and the addition of low melting point filler alloys which, for aluminum, are composed mainly of tin and zinc. Flow (flux), friction and ultrasonic methods are used.

This process has many industrial applications which are subject to dry conditions or which can be protected adequately in service. Soldered aluminum joints are susceptible to galvanic corrosion in outdoor and corrosive environments because present solders are electro-positive with respect to aluminum. Also, in flow soldering the flux is a potential source of corrosion and its removal is recommended.

Other Influencing Factors

In addition to the advantages, limitations and extent of use outlined there are a number of general factors which influence the selection of a process. In the table the merits of TIG, MIG, metal arc and oxy-gas welding are compared. These processes were chosen since their applications overlap. These comparisons are general. Individual applications should be considered in detail, using the table and the following factors as a reference.

The quantity of welding, and whether or not it is repetitive, influences the selection of a process and auxiliary equipment. In most cases, only the inert-gas-shielded arc and brazing processes need be considered. This applies to large as well as to small quantities which must meet specifications.

Large amounts of welding usually justify a considerable investment in welding equipment, including jigs and fixtures. TIG welding is well adapted to the machine welding of the lighter gauges where flanged joints are used or where the weld can be kept in compression during solidification. MIG welding, already a semi-automatic process, is well suited to machine welding on many applications, particularly repetitive work. Resistance welding is most applicable where very large quantities of welding are required in the appropriate gauges.

Cost factors of joining include capital expenditure for equipment, the actual welding expenses and the cost of preparation and finishing operations such as edge preparation, cleaning, fitting, assembling, handling, flux removal and surface finishing where necessary.

While all these factors must be considered in estimating welding costs, the actual welding expenses are the most important. They include the cost of filler wire, gas, flux and the maintenance of welding equipment as well as labor. These were considered when compiling the table.

Speed Reduces Costs

Generally speaking, the process which will enable a weldment to be made in the minimum time is the most economical. A careful consideration of all factors is necessary since high speed welding, properly applied, can greatly reduce handling and floor space requirements and effect considerable savings outside the actual welding operations.

Thick sections requiring multiple-passes are joined most efficiently by the MIG process. Sections of moderate thickness, 0.10 to 0.25 inch, may also be joined efficiently by MIG and TIG welding and with less facility by resistance welding, brazing, oxy-gas welding and some of the other arc processes. Material under approximately 0.10 inch thick is usually joined by resistance welding, inert-gas-shielded machine welding, brazing or manual TIG welding. Careful attention should be given to joint design and jigging of these thin gauges. Manual MIG welding can be used under special circumstances to avoid distortion, and in the welding of relatively long joints of regular contour.

NEXT MONTH:

TIG welding

In Months to Come:

MIG Welding
Metal Arc Welding
Oxyacetylene Welding
Brazing
Pre and Post-Weld Operations
Safety Precautions
These and other facets of welding aluminum will be covered in this series.

Large parts usually require field welding with equipment that is reasonably portable. In such cases, the inert-gas-shielded arc processes are preferred but metal arc and oxy-acetylene welding, with a flux, may be used though they reduce weld quality. In resistance welding the work must be brought to the machine.

Welding in other than the flat position may rule out the fusion welding processes which use a flux. Inert-gas-shielded arc welding, particularly MIG, can be carried out in all positions, including overhead, with almost equal ease.

Must Consider Composition

The chemical composition of the alloy being welded may determine the process. Resistance welding may be used on all wrought alloys. Oxy-gas welding and brazing are applicable only to 1100 and 3003 alloys, except for special applications where the light gauges of 5052 and 6061 may be considered. The inert-gas-shielded arc processes may be applied to all fusion weldable alloys. The welding of alloys containing 3% or more magnesium must be restricted to one of the inert-gas-shielded arc processes, or resistance welding. TIG is the most suitable for welding castings.

The corrosion resistance of a weldment may be impaired by the presence of flux residues, especially between faying surfaces, and their removal is recommended. High welding speeds, as obtained with resistance welding, MIG and, in some cases, TIG welding, minimize the effect of welding heat and result in maximum corrosion resistance.

Speed Increases Strength

As-welded strength is usually higher the faster the speed of welding, particularly if the proper welding process is used. Also, strength is dependent upon the quality of the weld which may be required to meet certain specifications. Welds of high strength and ductility can be produced most readily by the inert-gas-shielded arc welding processes and resistance welding.

The appearance of welds made by the inert-gas-shielded arc processes is superior to all others in most applications. However, welds made by brazing and by the oxy-gas process, to a limited extent, may have a smooth surface requiring little finishing except for the complete removal of flux residues and stains. If the strength of such welds is adequate, oxy-gas welding and brazing may be used on applications such as cooking utensils and furniture. On weldments that are to be chemically treated by processes such as anodizing, the inert-gas-shielded arc processes result in the best possible color match and appearance.

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The European Approach To Aluminum Curtain Walls

Curtain wall construction started 30 years ago when the Daily Express Building (at left) was built in England. Since then, curtain walls have been experimented with in Europe and America, but builders on both continents are still not satisfied with construction procedures. This paper, presented at a Building Symposium, held in England by the Aluminium Development Association, describes most common systems used in Switzerland.

by E. Muller, Dipl. Architect, SFIT/SIA, Zurich, Switzerland

A MODERN looking aluminum and glass building houses the Daily Express of London. This isn't particularly astounding today, but it was in 1932 when the structure was completed.

The Daily Express building (pictured above) is regarded as the forerunner of present-day light metal and glass buildings. Yet nearly 30 years after its erection we are still racking our brains for the best method of building a curtain wall. Progress has been made, of course, but there have been setbacks due to the entry into the industry of fabricators of limited or no experience with the problems of curtain walls. These include porosity, condensation, thermal expansion, etc.

Aluminum's many properties — especially those of the aluminum-magnesium-silicon, aluminum-magnesium, and aluminum-manganese alloys — have helped the light metal attain a leading position in the building industry. Progress in joining techniques (such as flash welding), in surface finishing (such as anodizing), and a stable price policy also contributed to this end.

Popular in U.S.A.

In the U. S. A. the aluminum curtain wall has become the most widely used form of construction for large buildings, especially skyscrapers. But in Europe, curtain wall buildings erected during the past 10 years are recognized for their variety and design detail, rather than for their size.

The development of modern building construction — separation into supporting skeleton and covering skin — began nearly three decades ago. Shortly after the Express building was built, a Frenchman, Jean Prouve, began experimenting with prefabricated metal components. He produced his first curtain wall unit in 1935 for the Pavilion of the Club d'Aviation Roland-Garros at Buc, England. In 1938 he used prefabricated panels for a Paris building, but these were of steel sheet.

After World War II Prouve continued his work. In 1948 he developed a completely prefabricated aluminum facade unit with built-in vertical window sash. A large number of these units were used in constructing the Federation Nationale du Batiment in Paris. Shortly afterward, similar experiments were tried in Switzerland. An example is the Lausanne Technical School (see photo).

Curtain Wall Usage Up

Today, aluminum is being used more and more for facades in every country in Europe. In Switzerland, for example, 22% of the aluminum produced during 1958 was used for buildings in which window and facade elements play a large part. The corresponding figure for Italy was 10%; for Germany, 8-9%; and for France, 6-7%.

The requirements for a curtain wall are the same everywhere: Protection of people and things from the effects of weather, and from the noise of traffic. However, there seem to be three essential differences between the conception and construction of curtain walls in America and Switzerland.

In the U. S. A., whenever possible, the building is completely cut off from the outside and modern air conditioning and lighting systems are used. This simplifies construction because often the window opening mechanism is omitted. In Switzerland, the people require, in addition to air conditioning, windows that can be opened. This makes construction more complicated and more expensive. It is not infrequent to find air conditioned Swiss offices in which windows can be opened, and in which an externally operated cleaning cradle is fitted.

Another difference is that fire resistance requirements of the facade walls are more stringent in the U. S. A. The severity of those regulations make curtain walls more expensive to build.

A main industry difference is that in Switzerland and many other European countries, the "general contractor" is unknown. Since the architect is responsible for the erection operations, he influences details of facade construction. In countries where a general contractor takes over, there is a strong tendency to apply a tested method as the standard for further building.

These distinctions, however, only appear in blocks having low story buildings, which are usual in Switzerland. With skyscrapers, of which a few have appeared in Europe, the differences level out. Rain collection, drainage, and the extraordinary wind stress in the upper portions present such problems that only well-tried construction methods can be adopted as standard.

Switzerland Has Variety

Many types of facade are familiar in Switzerland. One seen often has the skin mounted outside the supporting skeleton (Figure 1). A lattice of horizontal and vertical sections carries the window glazing on one side and the curtain wall panels on the other. In some arrangements the vertical column is unobstructed, developing a hollow section; in others, the vertical column is clearly divided, and the assembly

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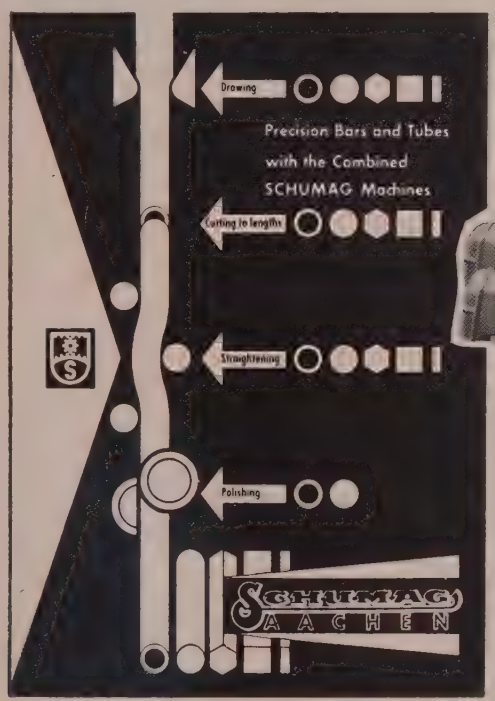

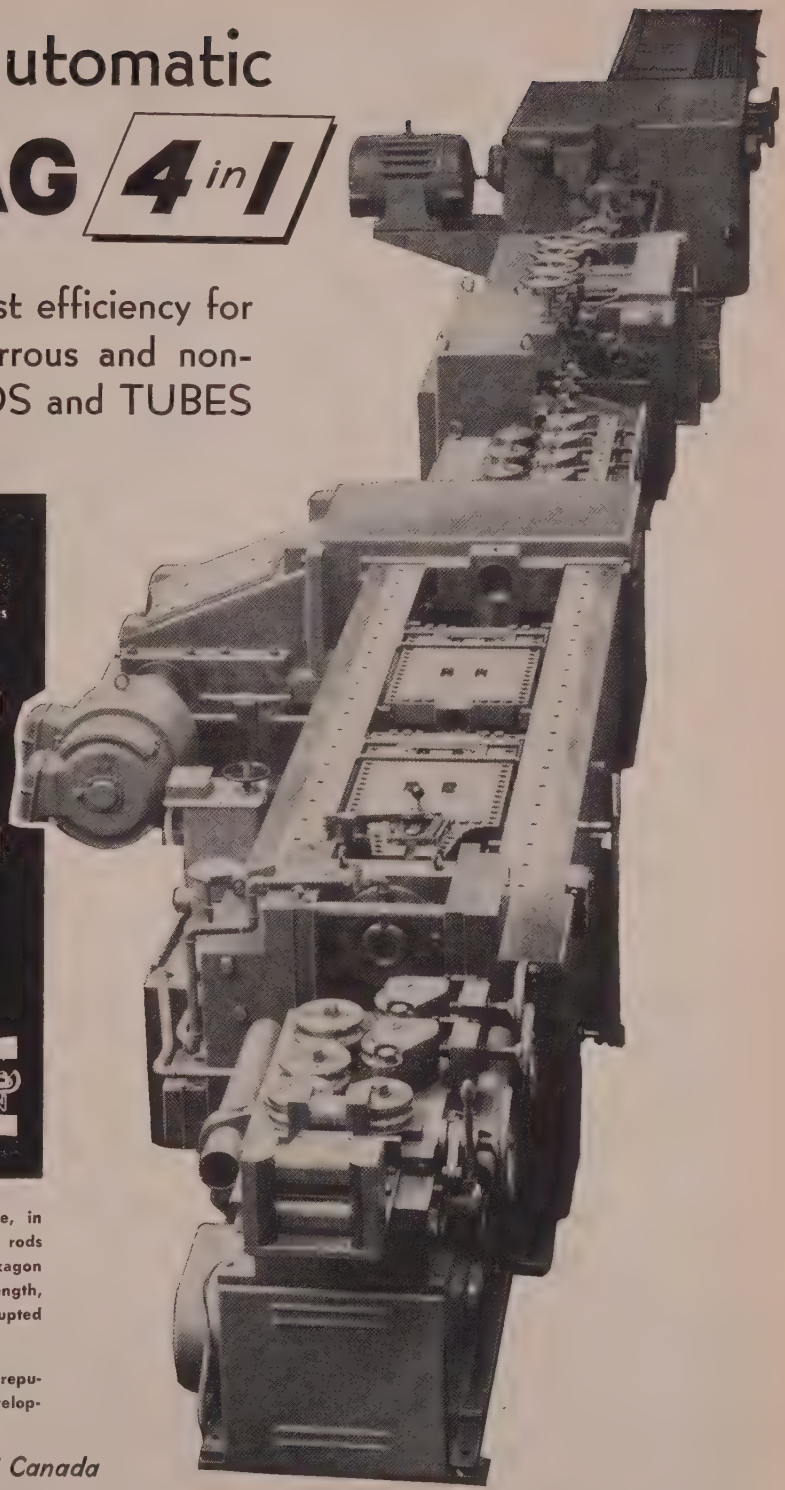

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With curtain walls in which the panelling is not built-in at the back, soundproofing at junctions of the facade skin and the horizontal floor plate is always a problem. The fixing of external blinds is also difficult.

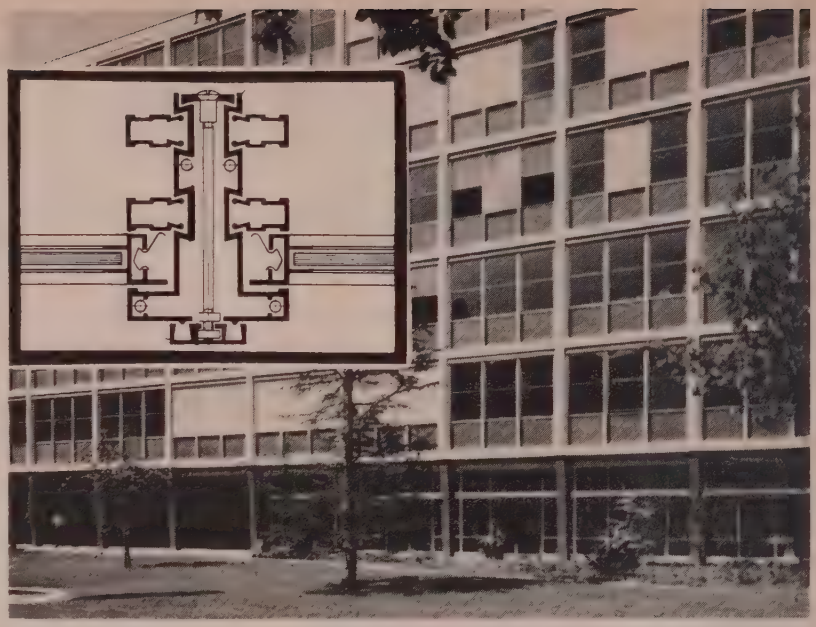
In another oft-seen system (Figure 2) every window element, including curtain wall panels, is separately attached to the skeleton. This affords better watertightness, and allows for thermal expansion of each element. The Alcoa Building in Pittsburgh is an example of this type construction.

More Facades

Another type has the facade element extending the full height of the story in which it is set, but does not break the horizontal edges of the skeleton structure at floor levels (Figure 3). Thus, projecting floor plates are visible horizontal elements of the facade, while visible vertical columns also add to the appearance. With this construction, each floor is well soundproofed and completely watertight. Here, external blinds are easily attached (Figure 4).

The type of construction in which the window and the breasting elements are separate (Figure 5) is made possible by a molding running between windows and panels. With this construction, the panelling is often slanted outwards (Figure 6) so blinds may be fitted to the building.

An arrangement that solves the problem of watertightness and sound insulation is that in which the elements of all upper stories project about 6 to 8 inches over the lower ones (Figure 7). However, this is useful only on low buildings.



■ *This is the Lausanne Technical School, Lausanne, Switzerland, built of prefabricated curtain wall units. Inset diagram shows how units are constructed and how vertical sash windows are built-in.*

Various curtain wall components have been adopted in Switzerland and other countries in Europe. The double-framed window construction with two sheets of glass, customary in many countries for wooden windows, is too costly for aluminum. Therefore, a more stable, single-frame unit with a single sheet of an insulating compound glass plate has been adopted.

In Scandinavian countries, triple glazing is often used to improve insulation. Mechanical corner joints are being replaced by flash welded joints, which give absolute watertightness and rigidity at the corners.

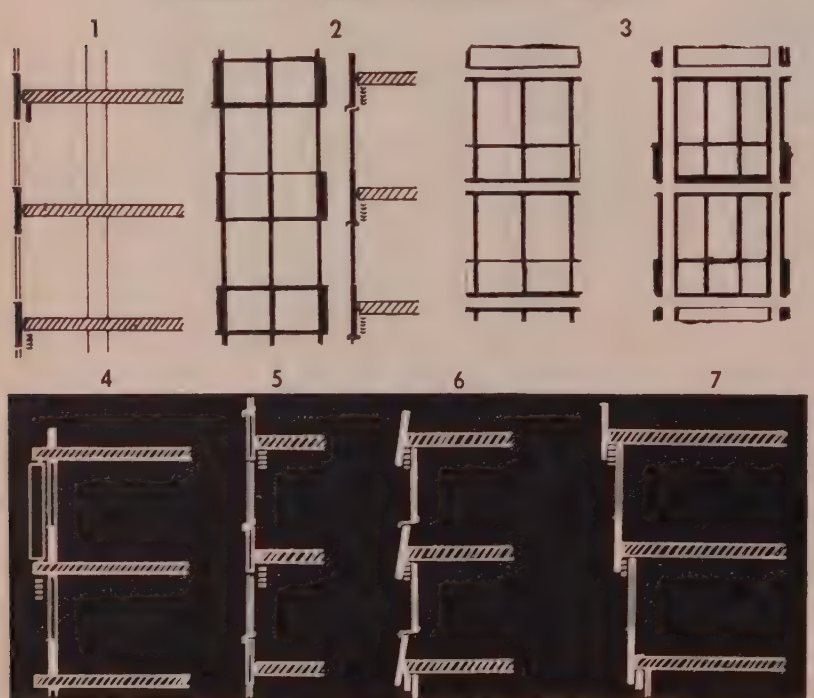
Recently in Switzerland, Germany and especially in Scandinavia, windows have appeared with an inner wooden bearing frame and an outer aluminum frame. The problem here is joining aluminum to wood, with only a sliding joint being feasible so far. To prevent mold formation from condensed moisture direct contact between wood and metal should be avoided.

Window With Insulation

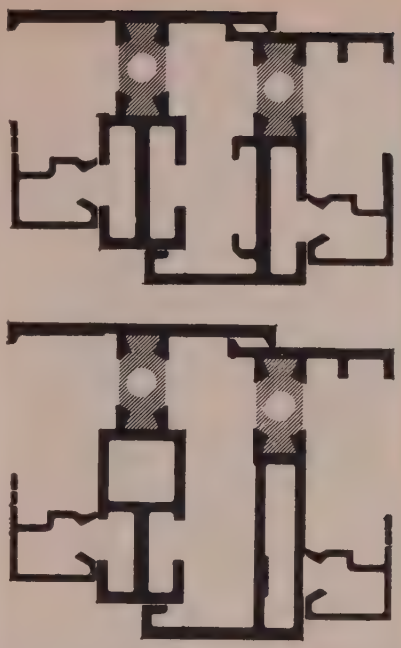
To make it possible to construct an all light metal window with insulation, a Swiss firm has developed a unit which has a central web of insulating material. These windows have been well received in Switzerland and Germany and are arousing great interest in Scandinavia. (See Figure 8.)

In a building without air conditioning an external sun screen should be provided. If air conditioning is installed, blinds can be placed outside to provide an effective heat shield against the sun's rays. It is difficult to fit slatted blinds on the outside of skyscrapers because of the effect of the wind.

Metal-glass panels allow water vapor



■ *Figures 1 through 7 illustrate the most familiar curtain wall systems used in Switzerland. Small parallel lines at top of window indicate where blinds are used, and if they are installed on the interior or exterior of the building.*



■ *Figure 8. Two types of window units that use Alsec, a light alloy curtain wall section with a central web of insulating material (shaded areas). This recent development has taken hold in parts of Europe.*

to seep through their seams, making the danger of condensation behind the facade skin greater than with porous stone or brickwork. To avoid this, ventilation should be provided between the skin and the inner layer of insulation.

Sandwich panels which have their own insulation are being used more and more to help solve this problem. When used, the sandwich element must be completely sealed to be effective.

Accent on Finish

Generally, in Switzerland, plate glass panels of a special quality are used for outer cladding. The glass is self cleaning and comes in various colors. Uncolored anodized aluminum sheet is used with the glass. Color anodized panels are uncommon because color fastness is still difficult with very large surfaces.

There are other possibilities for finishing the sheet. Progress is being made in porcelain enameling aluminum sheet in Switzerland and Germany. Plastics are also being considered as a coating, but this depends on their resistance to sun, ultra-violet rays and humidity. We have no long term experience with this.

It is astonishing how rapidly, in the past 10 years, aluminum has established itself in Europe — chiefly in the form of extruded sections for windows and facades — to take first place as a metal building material. This has been accomplished in spite of setbacks brought to the industry by inexperienced metal fabricators.

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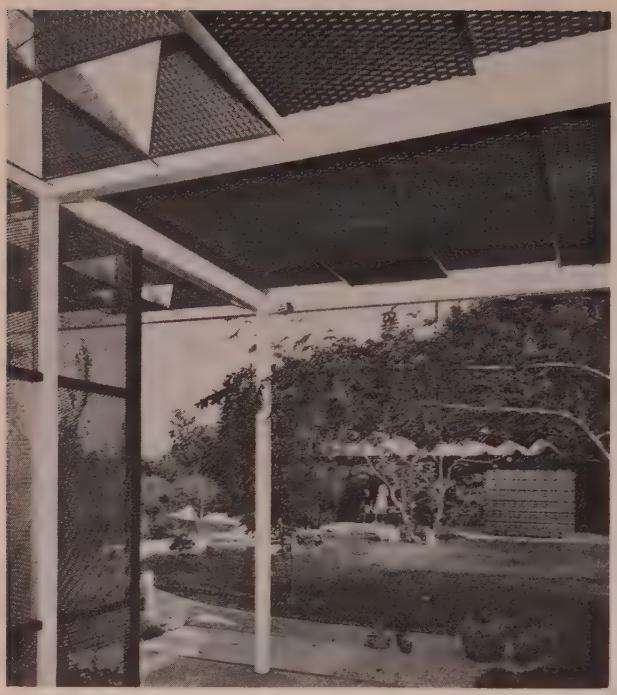

ALUMINUM invades the garden

Modern, light weight structures, designed by a leading landscape architect for Alcoa's Forecast Collection, demonstrate how aluminum can be put to use to make the average backyard more livable. Built almost entirely of standard aluminum mill products, Garrett Eckbo's creation may point the way to tomorrow's elegant garden.

THE backyard of the average home need no longer be the common sun-scorched plot of rampant crabgrass, bordered by wilted flower beds and harboring the prosaic pint-sized patio. With the help of aluminum it can be transformed into a comfortable shaded haven for the harried homeowner, one that will trim his weekend chores and give him some much-needed privacy.

Strictly Standard

One of the leading landscape architects has demonstrated how it can be done, using readily available standard aluminum products such as expanded metal, patterned and precolored sheet, and miscellaneous rods, bars, and extruded shapes. The principal non-standard element was the designer's ingenuity.

When Alcoa commissioned Garrett Eckbo to design a "Forecast Garden" that would exploit the versatility of aluminum, he had the ideal site — his own backyard in Hollywood, Calif. It was landscaped, to be sure, but there was a shortage of shade. This is a common shortcoming of American homes today, due to the widespread practice of removing all or most trees before building each new subdivision.

Eckbo solved his own shade shortage with style and elegance, and his creation should be of more than routine interest to home builders, homeowners and other landscape architects. As the accompanying illustrations show, the Forecast Garden is well beyond the financial grasp of the average suburbanite. But it does point the way for less ambitious efforts, which is one of the aims of Alcoa's Forecast program.

The fanciful but functional aluminum structures that took shape under Eckbo's guidance include: A large terrace roof sun break; a one-way screen; a curved decorative wall; a generously proportioned pavilion; and a modern, flower-like fountain.

The individual pre-finished parts for these structures were cut to size and shipped to Eckbo for erection with a minimum of trouble. Standard aluminum mechanical fasteners were used to assemble virtually the entire composition. Only the fountain, which is of welded construction, required any appreciable degree of fabrication in the shop or on site.

Following is a brief description of each of the structures:

Sun break: The 40 by 14-foot terrace roof structure, attached on two sides to an "L" of the house, forms an extension of the designer's studio. It consists of expanded Armorweave aluminum panels, set in alternating planes, two inches apart. There are two 40-foot bays.

■ ***The aluminum fountain suggests a large abstract flower. Fabricated from quarter-inch plate, the fountain is about 3½ feet high and approximately six feet wide, is finished in olive green baked enamel.***

Four of the panels are 4 by 6-foot structures composed of six half-open pyramids formed of aluminum tube and triangular-patterned aluminum sheet, anodized gold. The other panels are of aluminum mesh, anodized brown. Colors reflect rug and drapery colors in the adjacent living room.

Panels Go Up Easily

The triangular "skylights" not only offer an element of relief in the design, but also create and project an ever-changing pattern of light and shadow within the patio. The mesh panels subdue, but do not exclude, the sunlight. Lightweight construction made it possible to lift entire roof panels into place. The colors reflect the dominant hues in the adjacent living room.

One-way screen: This 8-foot long screen shields the living room from view from the studio, but permits a vista of the garden from the living room. It is composed of three horizontal panels of expanded mesh aluminum, anodized brown and gold.

Decorative wall: The 27-foot long curved wall at the end of the terrace shows how a fence can become a positive asset in landscape design. The 5½-foot high fence is assembled from narrow vertical aluminum panels of varying widths. Alternating gold and yellow anodized finishes carry the color scheme of the adjacent terrace. Four types of aluminum sheet — plain, ribbed, spangle,

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and decorative mesh – are intermixed.

Pavilion: This tasteful 27 by 12-foot garden house commands a view of the entire garden and house. It consists of a roof and two screens supported by a dark redwood frame. The roof appearing from the side as a series of giant corrugations of varying heights, is formed from three intermixed sizes and patterns of natural aluminum Expand-ed mesh, supported on brown anodized channels.

■ *Pavilion measures 27 by 12 feet, commands a view of garden and house, consists of a roof and two screens supported by redwood frame. Roof consists of three sizes and patterns of natural aluminum expanded sheet, supported on brown anodized channels. Rear screen is of brown anodized horizontal aluminum slats. Redwood and aluminum bench is cantilevered from screen. Other screen is a trellis made up of various shapes in different shades of anodized gold.*

Aluminum — Redwood

A 15-foot screen along the rear of the pavilion is an open pattern of aluminum horizontal slats, anodized brown, and framed in redwood. A 13-foot redwood and aluminum bench is cantilevered from screen.

The other screen is an 8-foot trellis, an open pattern of various aluminum extruded channels and shapes, finished in various shades of anodized gold. It was assembled at the job site.

Fountain: Resembling a giant abstract flower, the fountain is located near the center of the garden. Fabricated from quarter-inch aluminum plate, it stands about 8½ feet high at its highest point and spreads about 6 feet wide at its broadest point. Finish is olive green baked enamel.

The water motifs are five magenta-painted aluminum tubes with a natural anodic finish, which rise from the center of the fountain like flower stamens. Water overflows into a curved concrete basin, in which rugged rock contrasts with the precise triangular pattern of the fountain.

■ *View of shaded terrace of Forecast Garden. At right is the anodized brown and gold one-way screen which shields living room from studio. Also shown is part of sun break, consisting of brown expanded aluminum panels and gold anodized patterned sheet formed in half-open pyramids.*

It's a Natural

Designer Eckbo sees aluminum as a natural choice for garden structures such as these. He particularly likes the metal's amenability to an almost unlimited variety of colors and textures. The ease with which it is formed, cut, handled and erected is another important point in aluminum's favor.

"In proper combination with traditional garden materials—wood, masonry, plants, rocks and water—aluminum can add a new dimension in landscape expression," he explains.

But Eckbo is quick to add that the Forecast Garden is not intended as a prototype of some future standardized product. Rather, it is "a new concept for creating attractive and functional outdoor space areas, using the rich elegance of aluminum." Thus, aluminum may be tailored to the topography of each garden area and to the wishes of each owner.

A Home-Selling Gimmick?

For the large volume home builder who needs an attention-getting premium to stimulate sales, something along the lines suggested by the Forecast Garden might have interesting possibilities. A good landscape architect could create, say, four or five designs—on a more modest scale, of course—that would use basically the same aluminum components.

Erection could be simplified—perhaps something along the "erector set" principle—and components could be ordered in fair volume. Maybe the home buyer himself could build it. Above all, it would convert that barren back-yard into a pleasant and private outdoor leisure space—something few new homes have nowadays.

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The problem now has been solved with the development of the CLEPO **Even-Etch** Process which cleans wrought or extruded aluminum, removes all micro- and macro-corrosion and imparts to the surface a smooth, silvery appearance. **Even-Etch** is used widely as a final finish on many household aluminum products. It is used to prepare aluminum for both anodizing and welding. It provides an excellent, slightly toothed surface for a paint base or for subsequent conversion coatings.

The CLEPO **Even-Etch** Process is a rapid and efficient means of etching aluminum without scaling the tank or steam pipes or forming heavy sludge. Irritating fumes are reduced and the acid burn hazards encountered with other methods are eliminated. **Even-Etch** has a long life expectancy and will reduce cleaning costs to a minimum.

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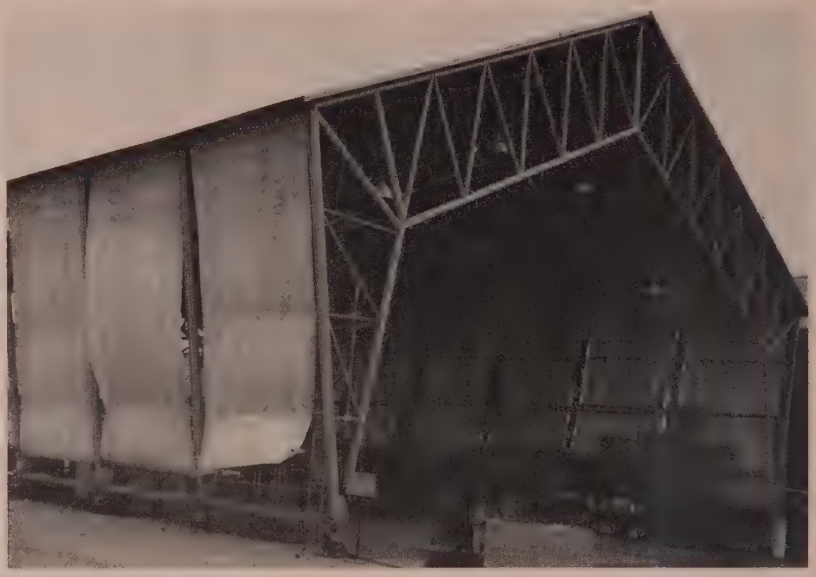

Magnesium Tubing Used For Snark Portable Hangar

Magnesium ZK21A extruded tubing, which requires no stress relief after welding, has been used in the framework of a large, portable experimental hangar for the Snark intercontinental missile.

The hanger was fabricated by Norair Division of Northrop Corp., Snark weapon system manager. Horizontal purlin members are bolted to five all-welded arch sections to form a module. One or more modules, mounted on casters, are used to make a hangar of any desired length.

Individual tubing components could be flown anywhere in the world, where there is welding equipment, and assembled in the field. Hangar modules are light enough to be moved manually. The structure is held in place by tie-down rods. Picture shows two hangar modules forming Snark enclosure.

Reynolds Tells Its Packaging Story At Show

A strong case for aluminum's versatility in packaging was advanced by Reynolds Metals Co. at the American Management Association's 29th Packaging Exposition, held at Atlantic City, N. J. last month.

Reynolds' 50 by 25-foot panoramic display included aluminum-packaged products ranging from beer to baby food and featured Reynolds' new 3-B boil-in-bag frozen food packages. It also offered a progress report on aluminum cans and the new foil Cluster-Pak developed by the aluminum producer for multi-packing containers.

Seven packages designed in aluminum foil which won awards in the Fourth Annual Flexible Packaging Competition, including three first prize winners, made a striking three-sided display. Laboratory charts and reports showed the advantages of aluminum and aluminum foil over other packaging materials in refrigeration, heat conductivity and protective qualities including light, air and moisture proofing.

The Cluster-Paks, which Reynolds now produces and sells under a license granted by Mead Packaging Division of Mead Corp., were displayed in foil-brilliant cartons giving billboard sales appeal to the products, while the adaptability of aluminum foil-polyethylene combinations was illustrated with Reynolds 3-B boil-in-bag food packages. These the housewife merely drops in boiling water to produce a meal.

Also displayed were samples of 10 foil-polyethylene combinations which give packages properties never before obtained including increased MVT (moisture-vapor-transmission) resistance, chemical resistance, heat-sealing advantages and many other qualities.

A demonstration of Reynolds' complete facilities and methods for production of aluminum foil folding cartons was given with samples of many products employing this popular aluminum packaging form.

Foil containers were shown in still another display and more than 150 exam-

ples of Reynolds full packaging line were displayed on a revolving "wheel."

Reynolds Reynolon oriented PVC film, which is heat-shrinkable to give skintight packaging, was displayed with products including phonograph records, textiles, and foods such as frankfurters and bacon. A beer case laminated with the film showed how it improves appearance and cuts the cost of these returnable cases nearly in half by giving longer life.

Magnesium Consumption Rose Last Year

A 17% increase in domestic consumption of magnesium last year compared with 1958 was reported by the U. S. Department of the Interior's Bureau of Mines. There was virtually no change in production. Exports rose more than 100% over the 1958 export figure, the Bureau said.

Fully 47,532 tons of magnesium were shipped in 1959, though production was only 31,033 tons. In 1958, shipments totaled 34,156 tons, and production was 30,096 tons.

Eighteen thousand tons of magnesium castings and wrought products were consumed in structural uses, and 22,675 tons were used for sacrificial and distributive purposes. Reclaimed scrap amounted to 6238 tons.

Big Captive Anodizer Goes Commercial

"Millions of remembrance advertising pieces" were the proving ground for anodizing operations carried on by Brown & Bigelow, St. Paul, Minn. Now the huge company, manufacturer of advertising calendars, greeting cards and plastic "remembrance" items, is freeing these captive facilities at 1621 E. Hennepin Ave. for job work.

Whether or not the decision to go into commercial anodizing is connected in any way with B&B's recent merger with Standard Packaging Corp. is not known. Brown & Bigelow will be called the Brown & Bigelow Division, Standard Packaging Corp. With 11 subsidiary companies, B&B grossed $50 million in sales last year; Standard Packaging did $85 million with 18 subsidiary companies. Report is that the merger is accompanied by plans for expansion of many facilities, including B&B's anodizing plant.

"Since Brown & Bigelow began anodizing with a small pilot plant for governmental work during World War II, we have proved the permanence and brilliance of our colors on millions of remembrance advertising pieces," said K. B. Priester, senior vice president, manufacturing. "These include pens,

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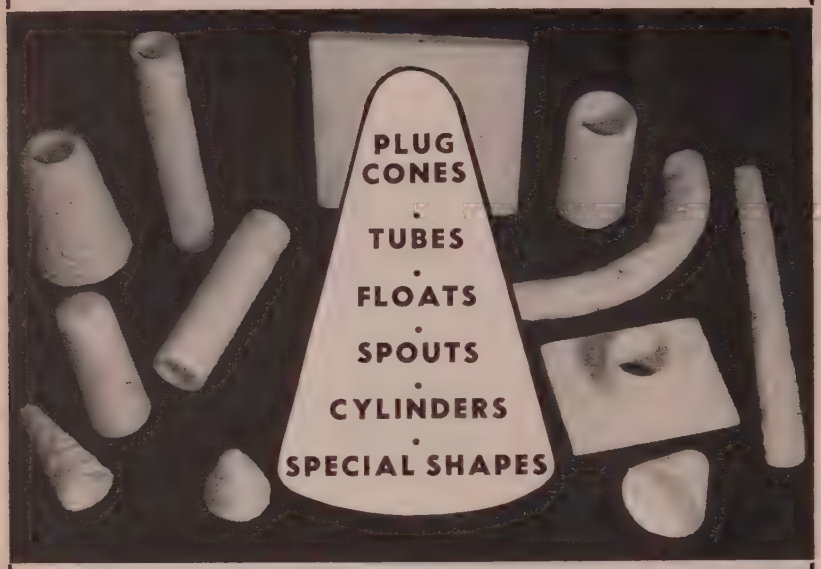

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pencils, lighters, home, office and desk items of many colors and finishes. The plant will have unlimited capacity for custom coloring of aluminum.

"We have rescheduled our operations so that our vast experience in the rapidly growing use of color in aluminum products will be available to other industries." Priester said.

Earl Craft, vice president mechanical arts, will be in charge of the East Hennepin anodizing operation.

Extruded Shapes Help Cut Office Handling Costs

A unique aluminum extruded shape helped International Postal Supply Co., New York, develop a message conveyor belt system which slashes office paper handling costs.

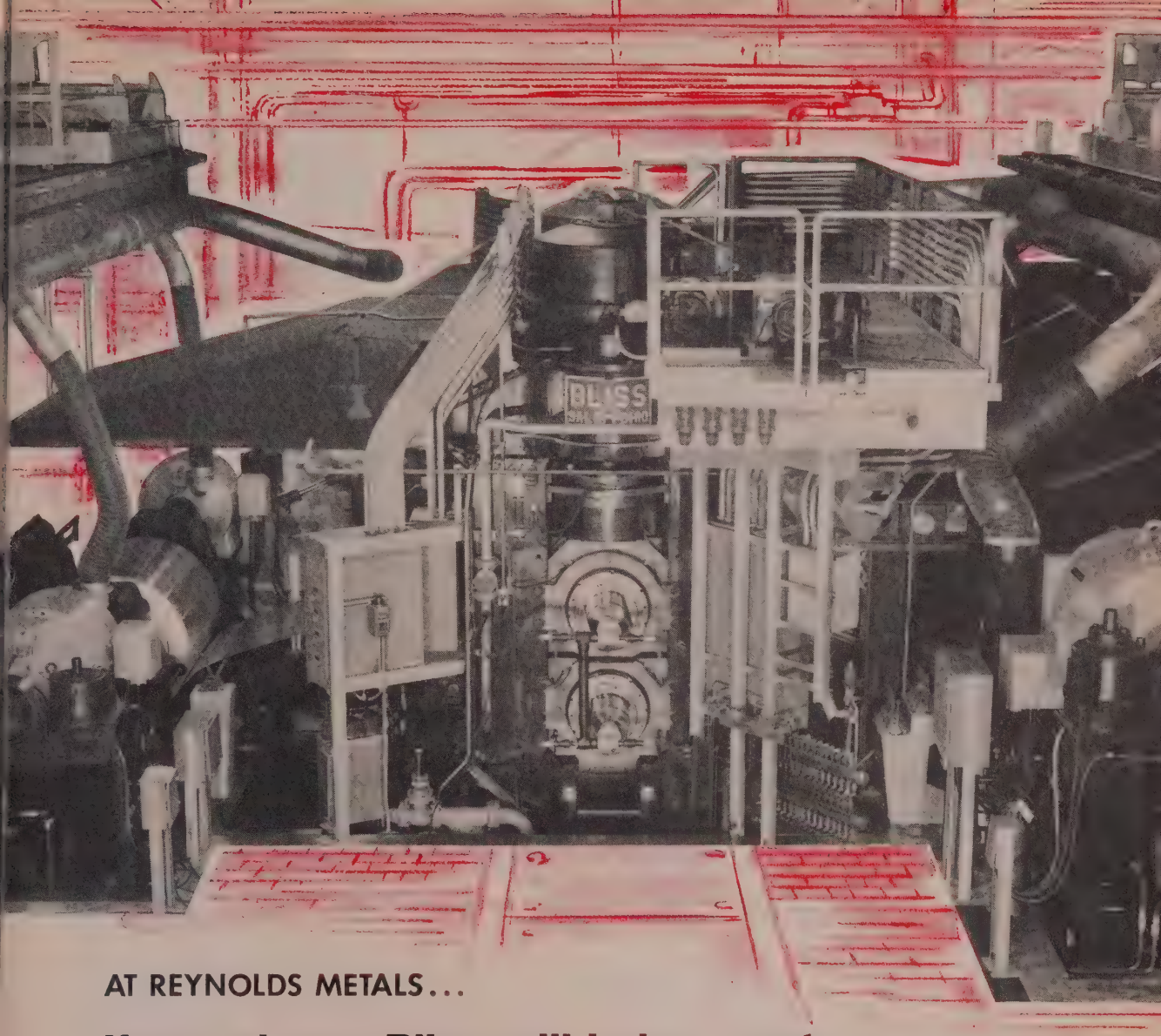
Called Multi-Flo Conveyor, the system has moving belts running on an aluminum base and separated by upright dividers. Both base and up to six uprights are integral parts of a single aluminum extrusion. When placed end to end, the interlocking extrusions in 8-foot modules form a multi-lane runway along which the belts carry cards.

Use of wide aluminum modules greatly simplifies installation and rearrangement and provides a strong, smooth conveyor system. It moves papers from desk to desk or from floor to floor, continuously in either direction, and around right angle turns. Stops or automatic ejection points can be set at any point along the belt.

Jalousies Shaded By New Panel, Clip

Jalousie windows have helped many families find added porch comfort, but some persons complain of the lack of privacy and inability to shade the porch without nullifying the jalousies' advantages.

Convertible Clip Corp., Falls Church, Va., has an answer to this problem in



AT REYNOLDS METALS...

Unusual new Bliss mill helps meet growing demand for bright aluminum strip

First of its kind to be installed by Reynolds Metals Company for sheet operations, this new Bliss two-high cold reduction mill recently went into operation at Reynolds' Alloys Plant, near Sheffield, Ala.

A 66-inch mill capable of speeds up to 1000 fpm and reductions as high as 50%, the new mill has been especially designed for rolling bright aluminum strip, now being used in increasing quantities for both decorative and structural applications by the automotive, aeronautical, trailer and other industries.

Among the unusual design features built into the mill by Bliss' Rolling Mill Division are a continuous line flow coolant filtration system and a special heating arrangement that maintains the proper shape of the rolls. Electronic controls provide gage consistency in high speed acceleration and deceleration, as well as permitting the operator to detect difficulties at any point in the rolling operation from his position at the control panel.

According to Reynolds Metals, the new Bliss mill is part of a $65,000,000 expansion and modernization program now going on at the Alloys Plant.

For more examples of Bliss rolling mill and accessory equipment currently in use in both ferrous and nonferrous rolling plants, write us today for your complimentary copy of our new 84-page Rolling Mill Brochure, Bulletin 40-B.

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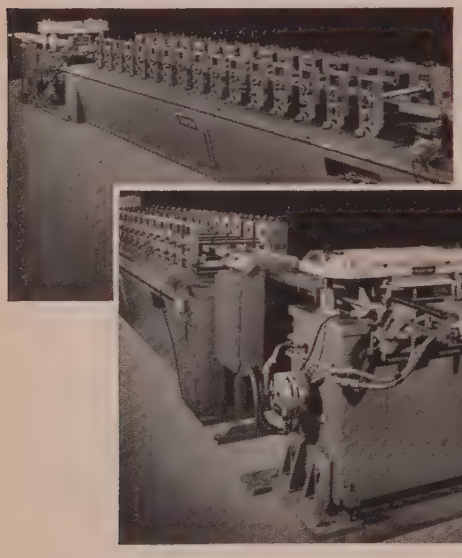
Jal-A-Shade, an aluminum panel which attaches to the jalousie slat by means of a special clip.

The clip was invented by John J. Limbach, president of the firm. It is shaped like a squat "S" (see inset in picture). The bottom half clips to the glass slat, leaving the top half free to hold the aluminum panel. When installed, the metal panels move with the glass panes, allowing the jalousie to ventilate normally, yet providing privacy and shade. In winter, when the sun is welcome, the panels are slipped off the pane, but the clip is left in place for quick installation the following year.

Because of aluminum's heat reflectivity, 90% of the heat rays striking the panels are reflected before they reach the glass, says the firm.

Panels are finished with white, green or blue DuPont baked enamel. Made in standard jalousie sizes, they can be installed without tools, except when an odd-size panel is being fitted. Then, a hacksaw is needed to cut panels to the correct size.

Convertible Clip has licensed its product and trademark to Reynolds Aluminum Supply Co., Atlanta, Ga., for manufacturing and distribution. Reynolds in turn has appointed Convertible Clip its Jal-A-Shade representative in the northeast part of the country.



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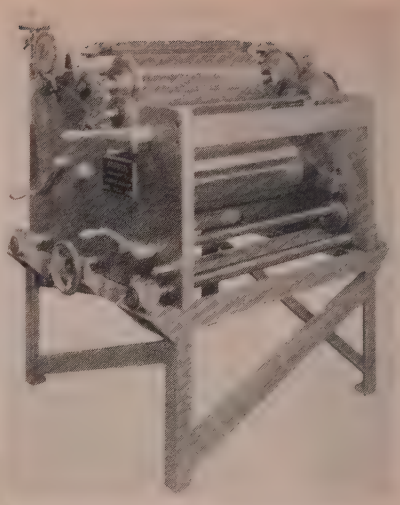

New Gravure Press Prints Wood Grain on Metal

A revolutionary offset gravure press, developed and manufactured by Faustel Inc., 5109 N. 125th St., Butler, Wis., has just been installed at the Pre-Finished Metals Co., Elk Grove, Ill. At Pre-Finish, the press is used for printing patterns and wood grains on metal, which are supplied to manufacturers of countless products.

This particular unit is supplied in a 20-inch width to suit requirements at Pre-Finish, but the machine can also be supplied in various widths up to 42 inches. Repeat range is 20 to 30 inches. The unit also features an eccentric throwoff mechanism between etched and offset and offset and impression cylinders. The doctor blade mechanism is easily adjustable.

The unit may also be used as a standard gravure press; several units can be mounted in line to print several colors if desired, Faustel reports, and can print five half-tones on heavy or light gauge metals, foil, textiles, film, board, paper, etc. Faustel claims that much more tone work can be obtained on rough surface stock with this equipment than with conventional gravure presses.

Portable Aluminum Towers Have Many Applications

Portable, self-supporting towers made of aluminum — in a direct gauge for gauge substitution for steel — are finding increasing use in the U. S. in widely different applications, according to Kaiser Aluminum & Chemical Corp. Kaiser supplies the extrusions and 5083 alloy plates for their manufacture by Pioneer Industries, Inc., Sioux City, Iowa.

For comparable loads and rigidity, the "Diamond Truss" towers are at least 60% lighter than steel towers. Because of this light weight, most roofs can support the aluminum towers without addi-

tional structural reinforcement of the building. Also, since the towers are self-supporting, guys are not needed.

These factors combine to make the aluminum towers suitable for installations ranging from defense to construction projects. The Air Force uses the towers in SAGE air defense systems and they are used as beacon towers, weather stations and portable guidance stations. They can be adapted to support all sizes of antenna. In addition, construction and oil companies employ the towers as supporting structures for various purposes.

Ned L. Ashton, designer of the nation's largest radio telescope installed at Green Bank, W. Va., designed the towers. Mr. Ashton also designed the first highway bridge using welded aluminum girders.

Diamond Truss towers contain 50 to 80% fewer members than other towers. Features include an exceptionally strong diamond-patterned bracing arrangement, and a patented extrusion designed as a mating telescoping section. Towers can be extended or strengthened for additional loads.

An aluminum hinged base permits the corrosion resistant towers to be assembled in one unit on the ground in a horizontal position, then raised into position in a few minutes. Also, they can be lowered as often as necessary to carry out work at ground level. Because it is easy to raise and lower the tower with the hinged base, salvage is economical.

A 110-foot aluminum Diamond Truss tower weighs only two-thirds as much as a 90-foot Class 2 wood pole. The aluminum towers can be designed for any load and deflection. Recently, a prototype installed at Tinker Air Force Base withstood winds of 120 miles per hour without noticeable deflection.

Extrusions Help Slash Truck Fabricating Costs

Aluminum Body Corp., Montebello, Calif., has cut its aluminum dump body fabricating costs about 20% by switching its entire production from conventional sheet and plate design to riveted models made of special extrusions.

"Customers find that the riveted bodies are easier to repair," says L. H. Magor, president of ABC. "Also, since the new dump bodies are of wide V-shaped extrusions, the body can be easily made larger or smaller by adding or taking off extruded sections."

Savings in transportation costs made possible by the unique dump body, which can be shipped knocked-down, allow low-cost deliveries. The extruded sections of the dump bodies may be assembled and riveted together at the customer's location.

Limited's Davis Urges Trade Barrier Reduction

Stockholders who attended Aluminium Limited's annual meeting in Montreal late last month gained a fresh insight into the complexities of aluminum production and marketing on a world-wide scale. Nathanael V. Davis, president of the corporation, told them of plans to keep Limited in the race for markets, wherever they may be.

Not the least of the obstacles in this race are prices of aluminum in the world markets, Davis said.

He referred to Aluminium Limited's standard export price of 23.25 cents per pound but noted that "this price does not apply in markets where duties and quotas must be taken into account." He gave the following examples of the going price equivalents in countries with import tariffs: United States, 26 cents per pound; Germany, 23.43 cents; Italy, 28.30 cents; France (after revaluation of the franc), 20.80 cents per pound.

The reduction of trade restrictions would help stabilize aluminum prices — "surely a most desirable condition for all users of aluminum," Davis declared. This would stimulate continued growth of aluminum consumption and encourage expansion of the industry, he added.

He urged an attempt to reduce trade barriers on aluminum at the next

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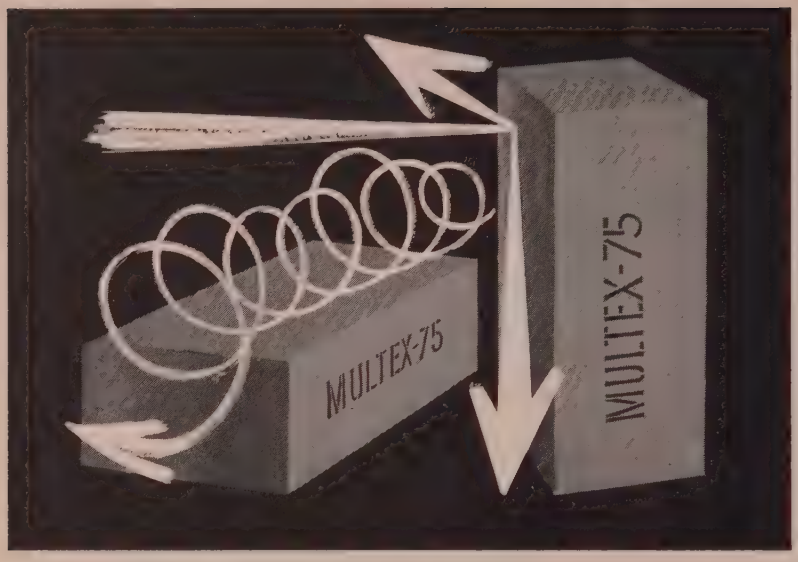

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G.A.T.T. negotiations.

Davis revealed that $6.5 million has been allocated in recent weeks for improvements at Alcan smelters at Arvida, Kitimat and Isle Maligne. These changes will increase capacity to produce extrusion billets and sheet ingots, he said.

An expenditure of $4 million is planned over the next two years to complete construction of potline buildings at Kitimat. Construction of these buildings was suspended in 1957. The program, which will add about 80,000 tons of annual capacity, does not yet involve installation of equipment.

"The fabricating side of our business continues to make headway," Davis reported. "Since the issuance of the annual report, fabricating projects that have taken definite form include a sheet and extrusion enterprise in Colombia, a utensil and collapsible tube factory in Venezuela, and two plants for the production of aluminum building sheets in East Africa."

Blind Rivets Insure Antenna Rigidity

The huge structure shown above is the world's largest three-axis antenna, designed by Philco Western Development Laboratories, Palo Alto, Calif., for the U. S. Air Force. It will receive telemetered information from satellites and missiles in any phase of their flight.

The need for rigidity in the structure is evident from the performance specifications established for the antenna which must respond to tracking commands to an accuracy of plus or minus two milliradians (about 0.11 deg.). Low deflection characteristics are built into the antenna's framework and deflector

through use of square aluminum tubing assembled with fasteners having high shear and tension strength, good clamping action and positive mechanical lock.

Wherever tubing is used, blind fastening applications (where the design provides access to one side of the work only) are encountered. In the Philco 3-axis antenna, more than 30,000 aluminum alloy Huck OS blind rivets are used. It is the only blind rivet available which possesses the unusually high shear strength required by the Philco specifications. The rivet's exceptional hole-filling characteristics contribute to its shear strength. In areas where the design provides access to both sides of the work, high-strength aluminum Huckbolt fasteners are used.

The OS structural blind rivet is a lock-spindle self-plugging type. The factory-assembled two-piece design consists of a pin and sleeve. The sleeve has an integral locking collar head. As the pin is pulled during installation with a pneumatic power tool, the blind head is automatically formed (in this case inside the tubing).

The locking collar is then automatically swaged into locking grooves on the pin (see photos of rivets bottom of picture). Finally, the pintail is automatically broken off essentially flush with the collar. The ⅜-inch nominal diameter OS rivet is made up of a 7075-T6 aluminum alloy pin and a 5056-H14 aluminum alloy sleeve.

Chrome Process, Alloy Developed for Car Bumpers

Kaiser Aluminum's Department of Metallurgical Research, Spokane, Wash., has developed a new series of heat treatable aluminum alloys and a chrome plating process especially for automobile bumpers. Car manufacturers will test production prototypes this winter.

"Auto manufacturers," points out R. G. Stanwood, Kaiser manager of automotive development, "are interested in bumpers which will reduce loads at the front and rear extremities of the vehicle where they adversely affect ride performance. With aluminum this weight can be reduced between 50 and 60%."

The new alloys have both high strength and good ductility for forming, says Kaiser. With this combination, bumpers can be made from aluminum sheet of approximately the same thickness as steel models.

Kaiser has applied for patents on the new aluminum plating process which produces a duplex nickel-chrome finish. According to Kaiser, laboratory and service tests indicate that aluminum plated with this process has good resistance to the corrosive action of road splash and will maintain its attractive brightness.

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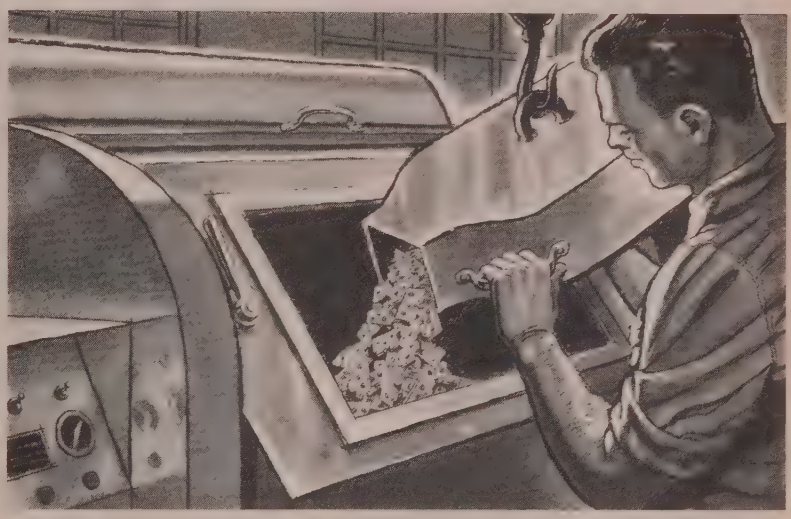

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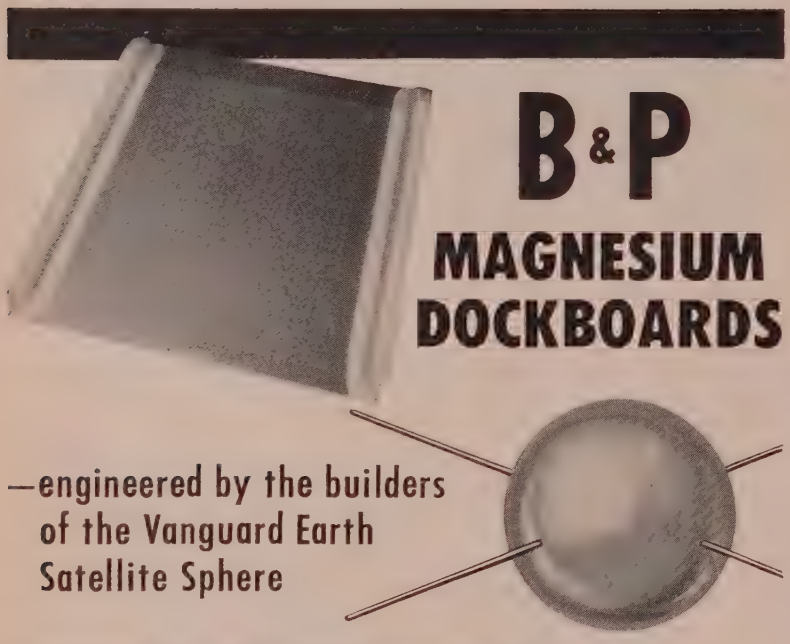
Indian Aluminum Plant Construction Begins

Construction is under way on the new aluminum producing facilities of Hindustan Aluminium Corp., Ltd., in India.

Work crews began clearing land for the joint venture, sponsored by the Birla interests of India and Kaiser Aluminum International, following ground breaking ceremonies at the plant site in Uttar Pradesh State. G. D. Birla, head of the House of Birla and chairman of Hindustan Aluminium, presided at the ceremonies which were attended by government officials and representatives of both countries' industries.

The integrated alumina and aluminum reduction plant is being built under the supervision of Kaiser Engineers Overseas Corp. at a site halfway between New Delhi and Calcutta and within two miles of the Rihand Dam, also under construction. Approximately 55,000 kw of hydroelectric power will be supplied to the reduction plant from the dam. Both the dam and the plant, which will have a capacity of 20,000 metric tons of primary aluminum, are scheduled for completion in 1962.



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Aluminum Foils to Double Super-Purity Production

An addition which will more than double the capacity of the super purity aluminum plant of Aluminum Foils Inc., Jackson, Tenn., is nearing completion.

The addition, a one-story structure of approximately 13,500 square feet, was designed by engineers of Aluminum Foils, and will be of the same basic plan as the original plant. Over-all costs will be about $500,000.

Walter J. Baenziger, executive vice president of the company, says the expansion was needed to help meet the rapidly growing demand for aluminum with a guaranteed minimum purity of 99.992%. It is used in chemical processing, electrolytic capacitors, metal refining and for jewelry, automotive and appliance trim.

Super purity aluminum (Raffinal) produced by Aluminum Foils has little structural strength and is therefore alloyed with magnesium to produce Reflectal, which has mechanical properties comparable to those of other aluminum alloys.

The firm's present super purity plant, claimed to be the first of its type built in the U. S., was completed in 1957, and is now operated on a 24-hour, seven-day-a-week basis.

Many Applications Claimed For New Decorative Grille

AL-dec — a new prefabricated aluminum product by Bohn Aluminum and Brass Corp., Detroit — is a decorative grillework resulting from a process which creates symmetrical perforations and patterns in aluminum shapes.

Because AL-dec can be produced in a variety of patterns and colors, it can be used by industrial designers and architects for household appliances, exterior and interior construction, and automobiles.

AL-dec comes in lengths up to 21 feet and widths up to 12 inches. Because of its overall symmetrical pattern, sections can be fastened side-by-side to produce a continuous screen or grille of any size.

New Cleaner Is Used Over and Over Again

A chlorinated cold-cleaning solvent that can be used repeatedly through reclamation in standard distillation units has been introduced by The Dow Chemical Co.

According to Dow, Chlorothene NU solvent is an appreciably improved version of Chlorothene. The company said Chlorothene has gained widespread ac-

ceptance as one of the least toxic and least expensive of all common chlorinated solvents.

The greater resistance of Chlorothene NU to decomposition now makes repeated reclamation easier without need of either stainless steel or Heresite-lined equipment. This money-saving feature, Dow noted, drastically increases for large users the solvent's desirability in industrial cold cleaning.

Dow said the recoverability of Chlorothene NU puts it on a comparable cost basis with common flammable solvents.

The manufacturer said Chlorothene NU quickly and thoroughly removes greases, oils, tars, waxes and other lubricating compounds often found on metal parts, electrical equipment, certain plastics and other materials. Its advantages include ease of use — by the dip, bucket, spray and wipe methods — greater safety, low corrosion and the fact that it leaves little or no residue.

The new solvent will be marketed in green and white color-coded drums so that it can be quickly distinguished from solvents with other characteristics.

Second Partnership for Alcoa, Imperial Chemical

Alcoa and Imperial Chemical Industries Ltd., have acquired joint ownership of Almin, Ltd., a British holding company for several businesses in the British aluminum industry.

The key firm in this group is said to be International Alloys, Ltd., described as a large secondary smelter. There are also several aluminum fabricating companies in the group.

Without revealing the price paid by Alcoa and Imperial Chemical, it was reported that each company would own 50% of Almin. A London news dispatch said that some $14 million was involved.

This is the second joint venture of Alcoa and the big British chemical company. Alcoa is a junior partner with Imperial Chemical Industries in Imperial Aluminium Ltd., rolling mill and extrusion plant in Wales.

Screen Makers Agree On Commercial Standard

A proposed commercial standard for roll-formed aluminum tubular frame window screens has been approved by members of the Screen Manufacturers Association for submission to the U. S. Department of Commerce, Commodity Standards Division, for formal promulgation.

The proposed standard, which has been under study by S.M.A. for nearly three years, was presented at the association's annual meeting held in Dallas in March.

George M. Schlosser, the association secretary, explained that it will be at least several months before the Commodity Standards Division will issue a formal commercial standard based upon the S.M.A. recommendation. Meanwhile, members of the S.M.A. plan wide distribution of the recommended standard in the hopes that its minimum specifications will be adopted voluntarily by manufacturers, dealers, and builders.

The proposed standard specifies a minimum thickness of .024-inch aluminum used for framing sections and cross braces and sets out minimum standards for hardware, aluminum or fibrous glass insect screening, and for the fabricating of finished screens. It also stipulates stringent tests to assure screens will fit and perform properly.

The standard also provides that "all framing sections shall have the nominal thickness of the material legibly imprinted (in decimals) intermittently along the entire length" and that sections be formed from commercially produced aluminum sheet with composition, mechanical properties, and tolerances conforming to ASTM specifications.

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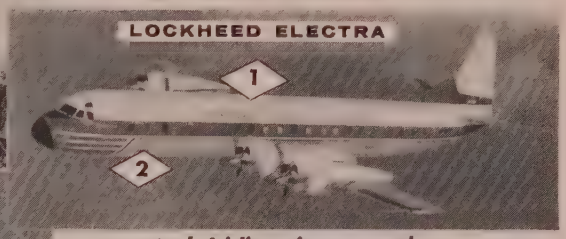

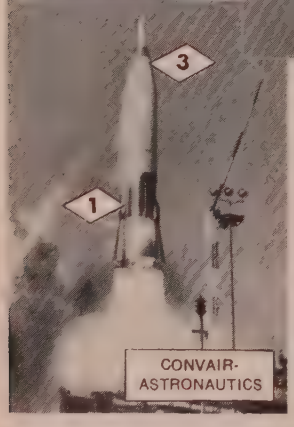

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Financial Briefs

Alcoa Reports Strong First Quarter

President Frank L. Magee of Aluminum Co. of America told stockholders of a gain of nearly 18% in the company's first quarter earnings and promised an aggressive sales effort to match the company's past battles for markets.

"Our past history is one of fighting for markets through practical research and development programs, and aggressive production and sales effort," Magee said. "We cannot and will not stand still in the race for markets and profits."

First quarter net was $12,635,046, or 56 cents per common share. Income for the same period last year was $10,725,430, or 49 cents per common share. Sales and operating revenues for the first three months were $221,177,053, compared to $189,573,648 for the like period in '59. Shares of common stock totaled 21,299,333, an increase of 285,914.

Currently declining aluminum inventories, built up by hedge buying late last year, were cited by Alcoa's president as the main reason why new orders can be expected to fall somewhat short of actual consumption. He said that business generally had fallen short of "boom" expectations because of consumer uncertainty, but felt that when the uncertainty had been dispelled there would be a substantial upsurge in the use of aluminum.

Diversification, Economy Efforts Pay Off for Bohn

Bohn Aluminum & Brass Corp., Detroit, a large aluminum fabricator, boosted its net 14% for the first quarter of 1960. Sales were $13,705,128, compared with $10,620,187 in the 1959 period. First quarter earnings rose to 97 cents a share from 86 cents a share last year.

Simon D. Den Uyl, chairman of Bohn, reported that the company's diversification and cost reduction programs are "having a beneficial effect" on sales and profits. This effect, he told Bohn stockholders, should become "cumulative in future years." He said that during the first quarter the largest gains were registered by some of the newest lines. These include heating and air conditioning equipment, parts for industrial power equipment, and fabricated aluminum products for many industries.

Revere Sales, Earnings Off 1959 Pace

Net income of Revere Copper and Brass Inc. for the first quarter of 1960 was $2,196,116, equal to 82 cents a

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All seven major editorial features from the September 1959 issue of Modern Metals have been brought together in one useful and interesting booklet (see table of contents below). To order copies, simply fill in order form below and return it, with payment, to Modern Metals, 435 N. Michigan Ave., Chicago 11.

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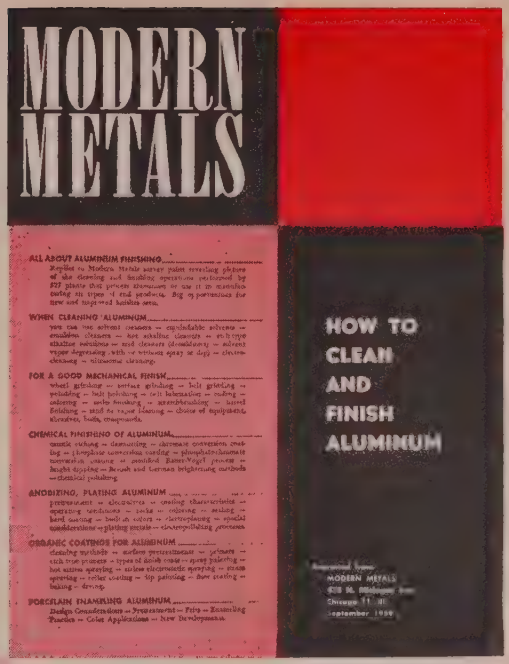

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share on 2,676,125 shares of common stock then outstanding. This compares with a net of $2,491,375, or 94 cents a share for the same period of 1959 when there were 2,638,306 shares outstanding, a decrease of 11.8%.

Revere sales for the 1960 period totalled $56,807,126, compared with $59,319,787 for the same period last year. James M. Kennedy, chairman of the board, and Charles A. Macfie, president, attributed the decline to a drop in housing starts, building construction, automobile output and general business activity, which reduced the demand for copper, brass and aluminum products.

Manufacturer's Representative for aluminum drawn tubing to call on metal warehouses and OEM in New York State. Send complete details to La-Pointe Industries, Rockville, Conn.

Kawneer Edges Through First Quarter in Black

Kawneer Co., Niles, Mich., had sales for the first quarter of 1960 amounting to $8,946,000 compared to $7,810,000 in the first quarter of 1959 while net income was $97,000 compared to $265,000 in like quarter of the previous year. On a per share basis net income amounted to 10 cents compared to 26 cents the previous year.

The substantial drop in earnings for the first quarter was caused by competitive pricing conditions, an unusual volume of first quarter business in low margin products, severe weather holding up construction activity and increasing costs on jobs in progress, unusually heavy expense of introducing new products, and start-up expense on new production facilities in California.

Lower Shipments, Higher Price; So Kaiser First Quarter Was Good

If domestic shipments of aluminum were lower than had been expected for the first quarter of 1960, it was because consumers were still calling on inventories built up when an aluminum strike was a late 1959 possibility. In pointing this out, D. A. Rhoades, Kaiser Aluminum's president, also stated that his company's earnings for the first quarter were favorably affected by an increase in the price of aluminum which became effective in December and by completion of a contract calling for shipments of bauxite to government stockpile.

Kaiser's net earnings for the first quarter were $7,297,000, compared with $4,206,000 for this period a year ago. Net sales were $111,085,000, compared with $97,247,000 for the first quarter in '59.

Cerro Aims to Improve Its Aluminum Sheet Operation

Cerro de Pasco Corp., leading producer of primary copper and nonferrous metal shapes, had an amazing growth record in the decade 1949-59, but the company still contends with unsatisfactory performance of some of its fabricating divisions, according to a letter to the stockholders from Robert P. Koenig, president.

The company's broad modernization and expansion activities here and abroad include plans (now underway) to increase production capacity of Fairmont Aluminum Co., Fairmont, W. Va., from 25,000,000 to 66,000,000 pounds per year of finished aluminum coil and flat sheet.

Calumet & Hecla Scores Record First Quarter; To Expand Alamet

H. Y. Bassett, C & H president, told shareholders at the company's annual meeting that first quarter sales of $20,703,700 exceeded both the first quarter record of $19,372,802 reached last year and the $19,674,515 total for the final quarter of 1959.

Earnings for the first quarter of this year were $1,367,490, equal to 61 cents per share of common stock. This compares with $1,360,135, equal to 66 cents

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per share of common stock for the same period last year.

Bassett announced that "if cost projections are met later this year," present plans call for doubling the size of the Alabama Metallurgical Corp. plant at Selma, Ala. Calumet & Hecla owns 70% of Alamet, a producer of magnesium.

Reynolds Metals Has Disappointing First Quarter

Reynolds Metals Co. profits of $6,050,000 on first quarter sales of $106,615,000, equivalent to 30 cents a share on 16,995,000 common shares, were substantially under last year's first quarter results. Sales for the '59 first quarter were $111,880,000 which netted $9,578,000, equal to 51 cents a share.

Reynolds' first quarter sales last year included $12 million in government stockpile deliveries which the company did not have in the quarter just ended. Their stockpiling contracts ended in 1959.

Other factors in the Reynolds first quarter picture were the advance buying in anticipation of the December price increase — several million dollars which normally would have been entered in January and February, and higher expenses in anticipation of increased volume and increased depreciation charges for new plant facilities not yet in full operation.

Men-on-the-move

Leon J. Gold has been elected vice president of Alsco, Inc. He has been vice president and assistant general manager of the Mastic Corp. He'll guide production, engineering, research and new product development at Alsco.

E. B. Thompson, sales manager, was elected a vice president of Parker Rust Proof Co., Detroit, manufacturer of pre-paint treatments and other anti corrosion chemicals.

Aluminum Foils, Inc. has named **William F. Franke** district manager of the company's New York office. He had been district manager of the Cleveland office. Under a new organization the Cleveland and Atlanta sales offices of Aluminum Foils will be under Franke's supervision. **Jack Hobbs** has been named manager of the Cleveland office.

Standard Packaging Corp., New York, has announced four major personnel changes in the corporation's Johnston Foil Division. **Howard J. Geraghty** has been named assistant to Walter Meditz, group vice president of Standard Packaging in charge of converting and packaging operations; **Ralph E. Herzler, Jr.**, becomes division manager of Johnston Foil. **Edwin E. Nelson** has been appointed sales manager.

Revere Copper and Brass Inc. has elected **John W. Eason** a vice president of the company. Eason had been appointed manager of Revere's Baltimore Division in 1959, before that, he was manager of the company's aluminum industry sales in the New York executive office.

Ray C. Wing has been appointed sales manager of the Metal Working Machinery Division of Oliver Machinery Co., Grand Rapids, Mich. This division of the company manufactures cut-off saws, and heavy-duty ferrous and nonferrous plate saws.

Robert E. Young, U. S. sales manager of Aluminium Limited Sales, Inc., has been named a vice president of the company which is the American sales subsidiary of Aluminium Limited. He has been U. S. sales manager since 1957.

Raymond C. McCullough has rejoined Bohn Aluminum & Brass Corp., Detroit as sales manager of extrusions and new products. McCullough has been identified with the aluminum industry in sales, engineering, and managerial capacities for the past 16 years. He will supervise national sales of Bohn aluminum extrusions, as well as products of Bohn's Special Products Division.

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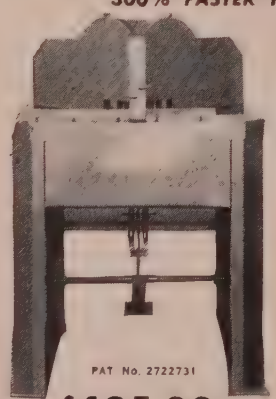

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Looking Ahead

Most bullish business sign of the "soul-searching sixties" came this month when Commerce Department reported that retail sales for April rose 3% above March to nearly $19 billion, and were well ahead of last October's $18.3 billion record. All the surveys pale to insignificance compared to the buying performance of the public. With warmer weather on the way the consumer may well buy more in May and June than ever before. If so, watch the appliance slump disappear, new home starts increase, and those hungry auto dealers start grinning again. Inventory liquidation is still going on, but we may find buying in the second half at a much more stable level than any time during the past two years.

The building picture was cloudy during the first quarter; now shows signs of strength. Example: Heavy construction. While admitting a 2 to 3% drop to date from last year, some now believe that current awards may offset the decline in the last half. Home building starts during the first quarter fell 12% from a year ago, while highway contracts and office and store building exceed last year's rate.

Biggest jump is among the 200 prefab builders. They estimate a whopping 145,000 homes will be prefabricated this year, vs. 132,000 last year and 105,000 in '58. This means a decided increase in aluminum consumption because of its heavy use by prefabbers. Reynolds is helping the movement by setting up 18 "shopping centers" from which 35 aluminum building products can be purchased by lumber yards, etc. This is a move in the right direction; big bottleneck still is a local place to buy the right type of aluminum when the builder needs it.

Magnesium picture may get brighter faster than you think. Sales of sand and permanent mold castings are off about 10% from a year ago, but die castings sales are up nearly 50%. Demand for extrusions and sheet is at about the same level as a year ago. Dow has decided the best area to sell magnesium is the auto industry; is doing something about it. Every night on their way home, motorists hear radio commercials telling them how much more they can get out of a pound of magnesium than any other material. Dow is also scurrying to complete a $400,000 customer laboratory by fall to help auto makers and die casters learn how to melt, cast and use magnesium. Dow will supply prototypes or a number of parts for testing on roads or proving grounds. Die casting machines that will produce castings weighing up to 20 pounds are being installed. A new semi-automatic machine is said to cast mag at twice the rate now possible with aluminum. As for price, Dow has offered magnesium at prices that are competitive with aluminum, with an added discount incentive for developmental costs. So the stage is being set. Looks like the right approach.

Advertising signs, both indoor and outdoor, will use increasing amounts of aluminum from now on. As revealed in the article beginning on page 32, here's an instance where aluminum and plastics were teamed up to create what amounts to a whole new market. The new plastic-aluminum sign took up where the old neon sign left off; opened new markets among all types of retail establishments. The gimmick — brand identification — isn't new, but the new signs enable the small retailer to cash in on national advertising at a small cost to himself. Beer and soft drinks are the outstanding examples now, but look for other products to get similar point-of-sale promotion from now on. Result: The 4 million pounds of aluminum used annually by sign makers will be dwarfed in the next few years.

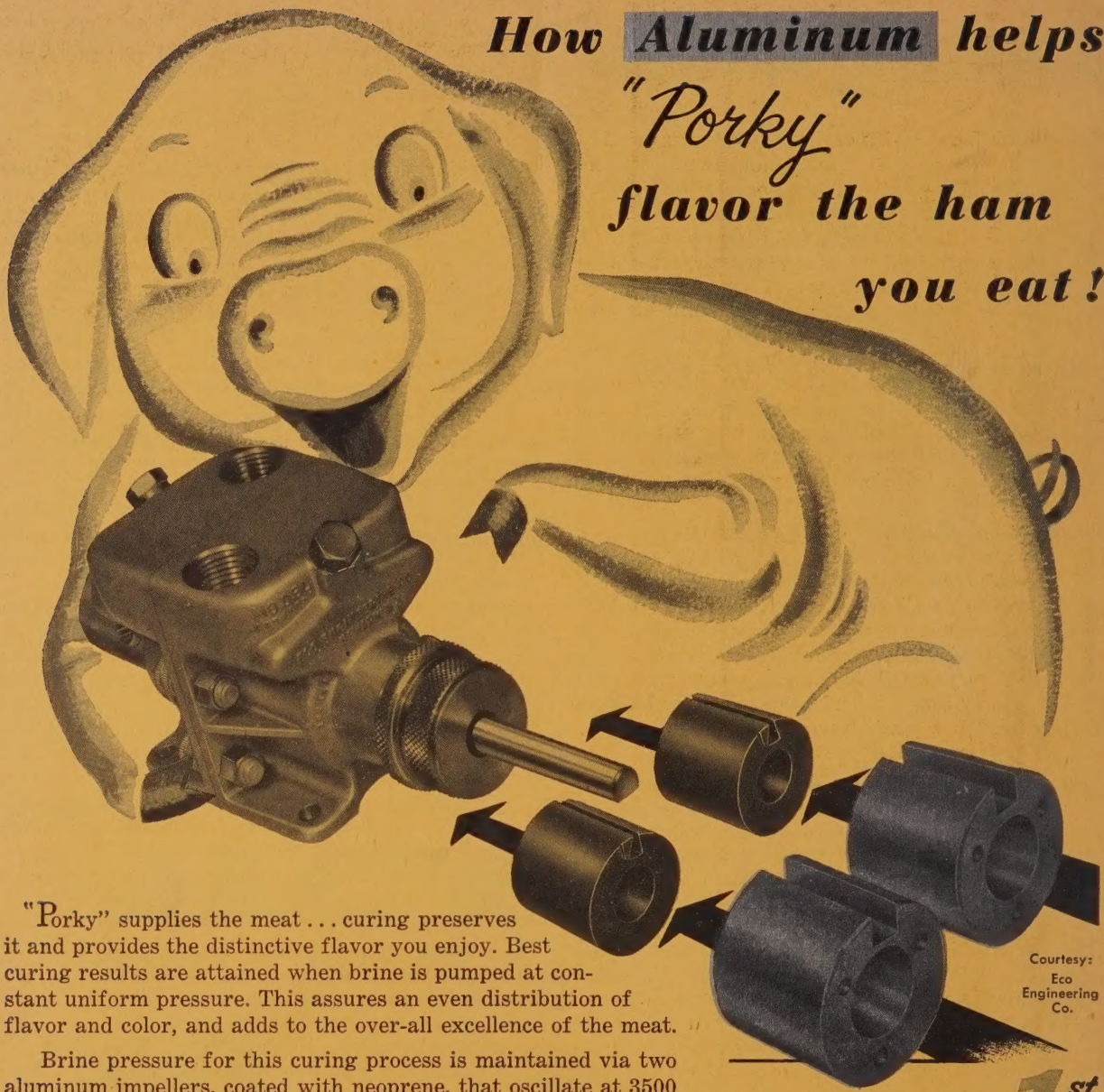
Aluminum furniture sales should get strong hypo from continuing trend to outdoor living. Retailers have put in big stocks of casual lines; anticipate brisk volume as more families migrate to the suburbs. One false note: Other retail outlets such as supermarkets are getting into the act; peddling flimsy lines at cut-rate prices. But new quality lines that combine aluminum with redwood, plastics, rattan, etc. should do well. Trend to shaped tubing, colored finishes is gaining momentum. School and institutional furniture will use more aluminum—mainly extrusions and castings — as industry leaders such as American Seating (see article on page 46) make greater use of the metal.

Aluminum's working on the railroad. Though not new as far as passenger cars are concerned, it's a big breakthrough in the freight field. Reynolds cracked the market when it sold Southern Railway System on using aluminum in 750 welded gondola cars. Other railroads have shown keen interest; at least one is said to have placed a good-sized order. Look for other aluminum producers to go after the market soon. We'll have a story on this in June or July.

New engine to be brought out by American Motors next year will be an in-line, 6-cylinder job with aluminum block and head die cast by Doehler-Jarvis (Toledo) and machined and assembled at American Motors' Kenosha plants. Die cast aluminum engines may also power some Chrysler Corp. products next year. Most likely candidates include the Valiant, Dart, 6-cylinder Plymouths, and the new Dodge compact car. Metal from Chrysalum (Canada) will be die cast at Chrysler's plant in Kokomo, Ind.

— The Editors

How Aluminum helps "Porky" flavor the ham you eat!



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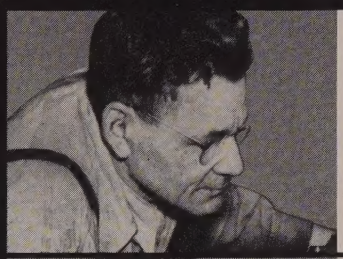

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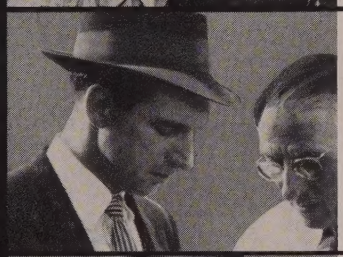

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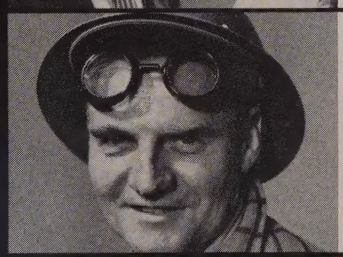

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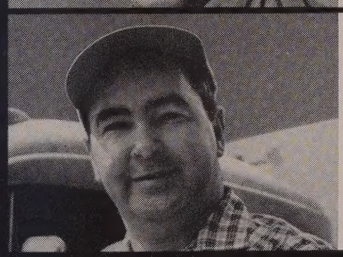

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